

# AUTOMOTIVE INDUSTRIES

## *The* AUTOMOBILE

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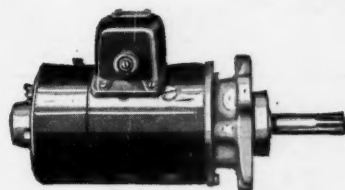
# ATWATER KENT

JAN 10 1921

## *Starting and Lighting Equipment*

STANDARD ON THE PACKARD SINGLE SIX

The selection of this equipment by  
The Packard Motor Car Company is  
a tribute to the quality and per-  
formance of Atwater Kent products.



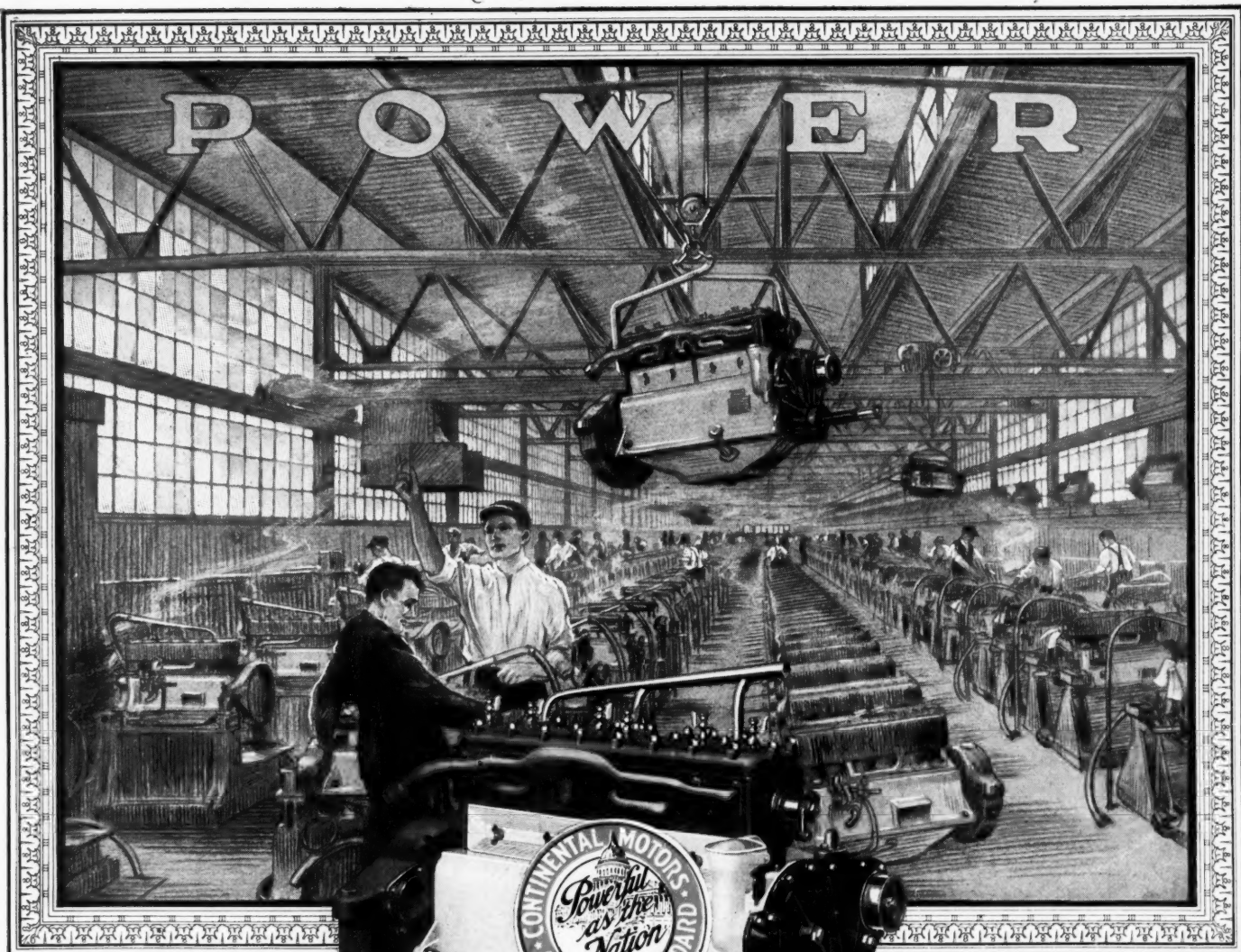
GENERATOR



STARTER

*An able engineering corps at your service*

ATWATER KENT MFG. COMPANY *Philadelphia*



Continental Motors will be on exhibition at the Chicago Automobile Show, Coliseum Gallery 50-51.

There is no one factor, of course, that is responsible for the dependability of the Red Seal Motor. Red Seal performance is the result of a combination of factors each of which contributes toward the perfection of the finished motor. But in the Continental Testing Room there is just a suggestion of the eternal care

that is largely responsible for Red Seal quality. For here, newly completed Red Seal motors are tested under their own power—dismantled—inspected—re-assembled and tested again—all as part of the program for upholding the quality that is everywhere associated with the Continental Red Seal.

## CONTINENTAL MOTORS CORPORATION

Offices: Detroit, U. S. A.

Factories: Detroit and Muskegon

Largest Exclusive Motor Manufacturers in the World

# Continental Motors

STANDARD POWER FOR TRUCKS, AUTOMOBILES AND TRACTORS



# AUTOMOTIVE INDUSTRIES

## The AUTOMOBILE

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NEW YORK—THURSDAY, JANUARY 6, 1921

No. 1

## Are Your Dealers Discontented? A Good Many Dealers Are!

We have heard so much about discontent and the prospective shakeup in dealer representation that we have obtained intimate opinions from 13 representative men. We believe these replies form a very important contribution to the research that must be made into the subject of automotive vehicle selling.

By Clyde Jennings

**A** FEW days ago there came into the Class Journal office a man who wanted to talk over the prospects of manufacturing a car. This man has a completely equipped factory; a satisfactory (to him) design of a car that has successfully made the experimental runs. What he needs is a dealer organization. When that is completed, he will be ready to give the word to begin manufacturing as soon as he thinks the selling situation is right.

What we want really to tell is this man's plan for building up a dealer organization. He has spent several months studying the situation as it presents itself and here is his conclusion:

There are many good dealers and distributors who are disgusted with the methods under which they have been working. They believe that they have been threatened, forced to do this and that, and have been given no voice whatever in the preparation of the article that they must pass on to the public. I am going to nose about among dealers and distributors, pick out some of these men and put them into my organization. I want 20 distributors and I am going to make these men into a selling board and the last word on the car design and method of selling will be

their word. In other words they will come into my organization as directors, representing their dealers, and have a voice in the making of the article they are to sell.

**A** FEW weeks ago the Uruguay legislature passed a bill making unlawful a merchandising contract with a foreign firm that could be cancelled by a 60-day notice.

The reason for this action is said to have been the cancellation of a sales contract between an American automotive manufacturer and an Uruguayan dealer. In this case, so it is reported, some vehicles shipped to this dealer before the cancellation notice was mailed did not reach him until after the cancellation became effective. The idea that influenced the legislators was that this dealer's investment in his business and the effort he had put into building up a good will were swept aside without a hearing of his side of the case.

**T**HESE two incidents would indicate that manufacturers have been somewhat high handed in their dealer operations. The two incidents might be

R.F.

construed to indicate that the present methods could be improved. Of course, none of us expects that any manufacturer will ever build a dealer organization that will be 100 per cent efficient and contented. Human nature has not reached that point as yet.

But it is reasonable to expect that the state of mind of the dealers and distributors would be such that a prospective manufacturer would not expect to build a worthy organization on the ruins of another's structure, and that legislatures need not be called in to protect dealers.

Now what are the facts as to the present state of mind of the dealers? There is only one place to find the answer, and that is the men most concerned—the dealers.

So the question was put to some of the most important dealers and distributors in the country. The question was asked by a man who knows the men who wrote the replies we will quote. The questioner knows these men well, he knows their families and their homes and so the men are truthful to each other.

We will say further, these men did not know that they were writing for publication, nor do they belong to the same organization. Probably 25 cars are handled by these men, as several of them sell more than one line of automobiles.

The question was this:

**In your opinion do you believe that there will be a general shakeup of dealer representation? Will dealers quit their lines for the reason that they believe that they have not had a square deal from their factories? What, in your opinion, will happen?**

Now come the answers. They are an important document, as important a document, I believe, as has ever been contributed to the sales end of the automotive business. Remember, in reading what follows, that you are reading the testimony of men who have sold motor cars for years. Some of them have been in the business twenty years, and all of them long enough to become recognized units in the business. They are not interlopers, nor are they mere observers. They are the men who have given a good account of themselves on the firing line.

Surely it is time for some manufacturers to stop, look and listen when such opinions are given by the best men in the business.

Just to keep the question in front of you as you read the replies, we repeat it here:

**In your opinion do you believe that there will be a general shakeup of dealer representation? Will dealers quit their lines for the reason that they believe that they have not had a square deal from their factories? What, in your opinion, will happen?**

1—I believe there will be a general shakeup and have talked with some of the distributors and factory branch managers and it is safe to assume that there will be a general shakeup and many of the dealers will be bothered. Here's what happened:

In many cases during the non-delivery period, many dealers have taken on lines on which they could get deliveries or hoped to, and where they previously carried one or two lines, they are now carrying four or five. In many instances they have done this, believing they have not received a fair deal from their factories. In most instances, perhaps, it was the fact that the factories could not make delivery. What is going to happen is this:

Many of the dealers who have been handling certain lines for many years will change and go on to other lines because of special and extra inducements given by these manufacturers to beat out the "other fellow." Of course, some of the better lines will not suffer from this materially, but some will. It will be a question here of the survival of the fittest.

2—No doubt there will be some changes to take place among the dealers, part of which will be caused by the desire of the factories to get better connections and part by the fact that some dealers who have sold cars that are more or less undesirable will endeavor to obtain better connections.

I believe this situation will be very much like the recent labor situation. When there are plenty of jobs it is rather hard to hold laboring men in line. In other words, a little competition should do no harm. It is my belief that there are a number of dealers in some cases handling very excellent lines who have no more right to success in business than I have to a place in heaven.

Anyone who is familiar with the automobile industry can testify that in no industry is there such a large number of men who are apparent successes but who, as a matter of fact, have been carried along by the current. No doubt, when it becomes a matter of selling automobiles rather than telling the people when you can give them a car, many of this class of dealers will be eliminated.

For many years I have found it very hard to understand how some fellows have been able to remain in business when you take into consideration the methods pursued in their various establishments. Some of the so-called successful automobile establishments remind one very much of the old-fashioned livery stable and one of the second-rate at that.

It must be taken into consideration that there are many distributors and dealers, as well as manufacturers in the business who had no right to start in the first place. Due to an over-liberal credit situation which existed up until about a year ago, many dealers started in the business on a very extensive scale on a very limited capital. I have a very intimate knowledge of one outfit that started on barely enough money to unload one carload of automobiles. Due to some particular good fortune, this concern has been able to remain in business and has at last got its finances on a rather substantial basis.

I believe that in the future to handle the automobile business, it will require more capital. In other words, fellows who have started in the past would be unable to duplicate the feat.

**This, undoubtedly, will result in a more substantial class of dealers with better methods and more profit to all who are in the industry.**

3—Dealers who have been handling several different lines will quit all but possibly two lines. In some cases, they will handle only one line.

4—Dealers cannot afford to quit their lines, even though many have just grievances. At present, factories hold the reins and distributors and dealers alike must comply with their wishes and accede to their demands.

5—My opinion is that there is going to be some awful change. I have received quite a few letters from distributors and dealers with whom I was not connected at all in the business world, who have told me that they were waiting for the time to come when the cars would be plentiful and they could tell the manufacturers to go to hell.



I am giving you this just as they put it to me.

My opinion is that if the manufacturer does not do something soon to get his dealer organization together and regain their confidence that the different manufacturers will be bidding against each other trying to get the best representative, because he, the manufacturer, will get desperate and will do these things in order to save his factory organization.

6—There will be no shakeup in our dealers. Our factory has been running almost continually. I do know, though, of a lot of dealers who are dissatisfied with the service they receive from their factory and are willing to jump to some other make of car, but the dealers who are handling cars made by reputable manufacturers will not give up their agencies and the factories are not increasing the number of dealers, so we hardly know what will become of the dealers who want to jump.

I imagine that a lot of dealers are going out of business. I know that a lot of Blank dealers are going to and have, either because they could not get the cars, the cars were no good, made bad deals, and cut prices and did not know how to conduct their business.

7—Some dealers who have good lines and are not well financed will, undoubtedly, be forced out, and the dealers with poor lines who are well financed will ease into the place vacated by the former. This is natural. I do not believe that dealers will quit their present lines unless for the purpose of securing a better one.

The successful automobile man is an optimist and lives in the belief that things will change for the better tomorrow. They look forward to improved relations with the factory on the theory that "further up the creek you go, the better the fishing."

8—I do believe there will be a general shakeup of dealer representation when cars become more plentiful, but I do not think that this will take the form of changing agencies. Rather the dealer will go out of business, because I am satisfied that there are too many dealers and too many manufacturers in this business at this time.

9—The need of education in the automobile dealer industry along merchandising principles, as laid down by other successful lines of business, when automobile dealers have to sell their cars, will bring forth many changes and shakeups because the dealer does not know how much it costs him to do business. Dealers will quit more on this account than because they have not been treated fairly.

In most cases, their organizations will have become so badly disrupted they will not know who or what to blame. Furthermore, there are many dealers and distributors organizations who are handling the product of certain manufacturers whose unfairness has caused them loss of money, prestige and so forth, who will switch from their present position to take on the line of automobiles from the manufacturer who has a clearer vision of the automobile industry which the dealer or distributor occupies.

10—There is going to be quite a change in dealer representations throughout the country, as I believe that the dealer who is well organized, which includes sufficient financial backing, will be in a position to obtain the pick of agencies.

There are many dealers who have not received a square deal from their factories and I believe that if this financial stringency continues that many dealers will be forced to retire, and this will leave the better dealers to command something from the factories and they will be in a position that they have never been in before.

11—I think the time is not yet here when dealers will give up standard profitable lines, no matter how they might feel. If the factories impose conditions which dealers find it hard to meet and still handle their outputs, some readjustment will have to take place. One factory, for instance, imposes a \$15 national advertising charge on every car which we must pass on to the customer. I think the manufacturers of less known cars will suffer seriously under present conditions of contracts in view of coming competition and fall-off in the market.

12—This is entirely problematical in my mind. It is to be presumed that there will be several changes both from the dealer viewpoint and the factory viewpoint. Both may be justified. We are looking forward to some changes in our own distributing organization of dealers. Dead-wood is appearing; that is, those who cannot sell, but were able to take orders. We must have sellers in a buyers' market.

13—It is natural that every factory will look for the best dealer representation it can find. If it finds its present dealer complaining against the treatment received it will either mollify him or look else-

where. The standard lines always will be well represented. I believe the average dealer continues to do business as long as possible with the factory he is familiar with, and I believe that statistics will show that most cancellations are made by the factories.

You will note in reading these answers that six men are outspoken in the opinion that there will be a big shakeup among dealers, while only three are outspoken against it and at least a part of the three give the opinion as referring only to the organizations they represent.

You will also note that five of these men speak out squarely that the dealers have not had a square deal.

ACCORDING to A. P. Young, writing in *Engineering* (London), if a spark gap be connected to an alternator or transformer designed to produce about the same voltage as that generated by a magneto (say 10,000) at the usual frequency of 50 per second, owing to the comparatively slow rate of application of the voltage, the spark voltage will be much less than with a magneto, in which latter the secondary voltage builds up extremely rapidly. The ratio between the spark voltage with magneto current with an ordinary alternating current of 50 cycles per second is frequently known as impulse ratio.

Yes, there are more questions.

This article and those to follow delve more deeply into the question of dealer-manufacturer relations than anything heretofore put on paper. The frankness and honesty of the replies to the questions must be their own defense. No names will be given in this treatment of the question. But we will endeavor to make plain to the manufacturer just what his dealer thinks about a number of very important topics, such as:

The bad taste left after the allotments in 1919.

Introduction of new models.

Careless factory inspection.

Poor assembly.

Price changes.

Dealer contract.

# New Model Lexington Car Uses Ansted Engine

Model T chassis similar to model S except for new engine. Latter is high speed type with overhead valves, novel rocking valve gear, and vacuum oil control. Large well heated inlet manifold cast integral with exhaust header. Hand brake is mounted on transmission. Makers set good precedent by furnishing more detailed specifications than are customary.

By J. Edward Schipper

**A** NEW make of engine, the Ansted, features the new model of Lexington car. Otherwise, the new chassis is very similar to the model S (which will be continued), though the wheelbase has been considerably lengthened. For the present the new chassis will be fitted with seven-passenger and closed bodies only.

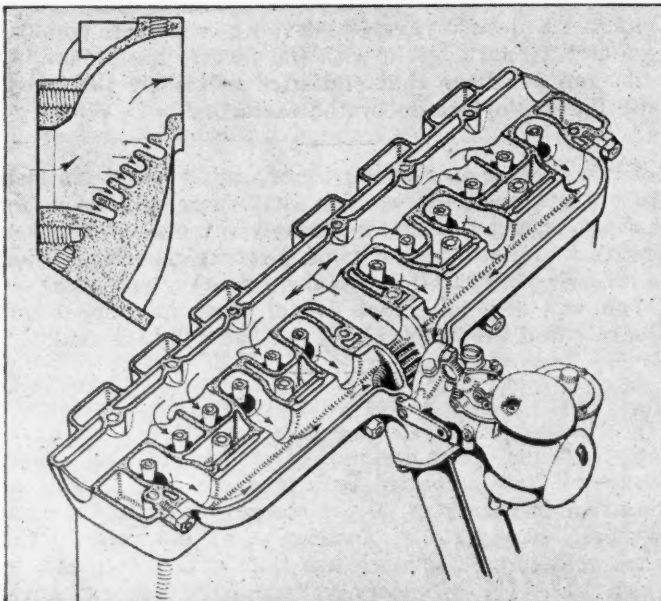
The Ansted engine is a valve-in-head type and is designed for operation at high rotative speeds, hence it is capable of giving considerably more power than the L head engine formerly used, though it is of the same piston displacement. Its maximum output of 73 hp. is obtained at 3200 r.p.m. It is of 224 cu. in. displacement and the maximum brake horsepower per cubic inch of displacement is 0.325.

The cylinder barrels and upper half of the crankcase are in one casting, which makes a good manufacturing job. All finished surfaces of the block are at right angles or parallel to the bottom face of the cylinders. The water jackets are carried the entire length of the cylinder wall, and there are water spaces between adjacent cylinder barrels. The pressed steel underpan acts as an oil reservoir. The timing gear cover plate is so fash-

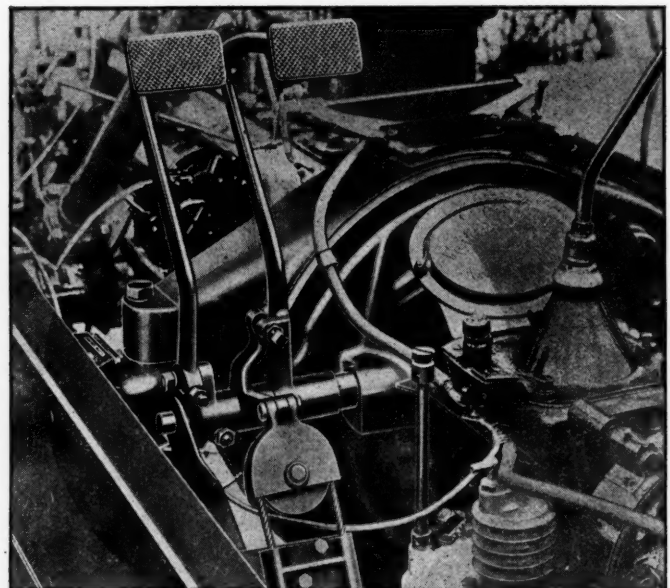
ioned as to provide a suitable support for the electric generator.

The piston is a light cast iron shell, well ribbed and provided with only two rings. The piston pin is fastened in the connecting rod and bears in the piston pin bosses. There is a deep groove around the piston at the pin and there are two horizontal grooves on each side of the piston pin hole, so that oil scraped off the cylinder wall may be fed into the piston pin bearing. The two piston rings have a stepped joint and are provided with saw cuts to keep down oil leakage and also to assure perfect packing. Two of these rings were found to do the work of the three used on the experimental cars. The pistons have crowned heads and are machined on all exterior faces.

The connecting rod big end is lined with babbitt cast directly into the rod in order to insure good cooling of the bearing surfaces. In assembling, the rods are all weighed on a scale and grouped so that the differences in the weights of the big ends will not exceed 1/10 oz. In this weighing operation the piston pin end is mounted on a stationary knife edge and the big end on another knife edge located on the scale pan of the balance.

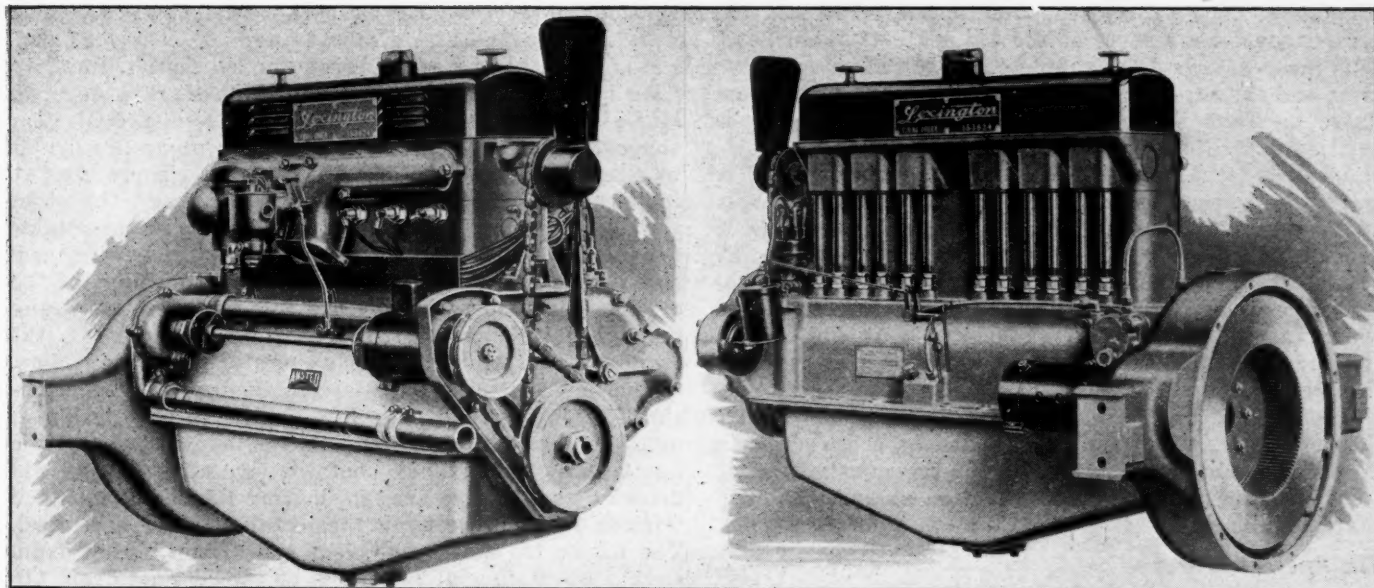


Sectional diagram of combined intake and exhaust manifolds, showing the vaporizing device employed on the Ansted engine used in Lexington car



Pedal controls, showing new equalizing device used on foot brake cables





*The Ansted engine used in Lexington model T cars, showing belt drive for fan, generator and water pump*

The crankshaft is unusually stiff and is very carefully balanced on a Carwen balancing machine before it is sent to the assembling department. The shaft is drop forged and has three main bearings. These are stepped so as to make the boring and reaming more economical and accurate. The bearings are assembled with a 0.006-in. shim between the case and the caps. They are reamed to size before the engine is run and do not have to be scraped or burned in. The front and rear bearings are provided with annular oil supply grooves, but aside from these there are no grooves in any of the main or connecting rod bearings.

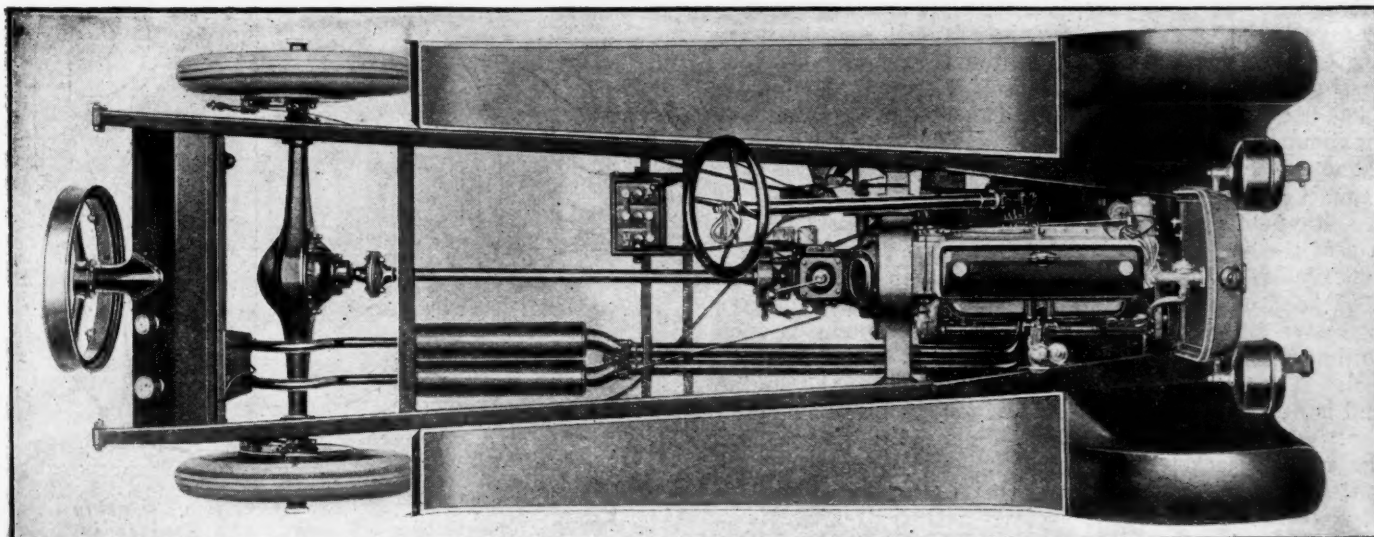
The crankpins all have 0.4375-in. holes through their centers and the connecting holes from the main bearings to the pins and between the adjacent pins are all 11/32 in. in diameter. The crank cheeks are unusually heavy in section. Care has been taken to prevent oil leakage at both the front and rear ends of the crankshaft. At the front end there is a thrower ring on the inside of the crankcase, and a series of thin cork washers in the timing gear cover. At the rear end of the shaft there is an oil thrower ring turned integral with the shaft. Supplementing this there is a return thread on the shaft. At the rear end of the main bearing there

is a small drain groove to prevent the oil under pressure from working out around the oil thrower ring.

The valve gear is unique in that the valve rocker arms are so mounted that their fulcrum points provide a variable rocker arm ratio from 1.265 to 3.047 to 1, which causes the valve to start and stop slowly, but to obtain greater and more rapid lift than would be possible with a constant ratio rocker arm. This prevents valve clatter at high engine speeds. Double valve springs are used to prevent synchronism between the valves and the rest of the mechanism from causing floating.

The valve tappets are easily accessible, as the tappet guides are held in place merely by the push rod inclosing tube. The tubes which inclose the push rods and through which the engine breathes are not fixed in place, but are pushed up into a counterbore in the bottom of the cylinder head and have a nut at the bottom end which presses down against the valve tappet guide. The latter is thereby held in place by the tube and the push rod completely inclosed. The valve tappet guides are grouped in pairs and have between them a small fillister head screw which prevents their turning in the cylinder casting.

The valve mechanism, including the rocker arms, is



*Plan view of the series T Lexington chassis*

completely inclosed, and the breather is located in the pressed steel valve cover on the top of the cylinder head. This insures a plentiful supply of oil to the valve rocker arms and the cup in the rocker arm is always full of oil. Valve clearance can be adjusted while the engine is running, which is said to be a great convenience.

A conventional three-bearing camshaft is used. The valve timing is as follows. Exhaust closes and intake opens at 10 deg. past top dead center; exhaust opens 50 deg. ahead of bottom dead center and intake closes 57 deg. after bottom dead center. The front bearing does not support the camshaft directly, but through a sleeve which carries the ignition distributor gear at its rear end and a flange at the front end. To the latter the camshaft gear is secured with four cap screws. End play is taken up at the forward end by a phosphor bronze thrust washer, which can be adjusted by a set screw in the timing gear cover. The flange on the camshaft collar takes the thrust in the other direction against the camshaft bushing.

### The Fuel Vaporizer

A horizontal Rayfield carbureter is bolted to the combined intake and exhaust manifold on the right side of the engine. The mixture leaving the carbureter strikes a series of ribs that are heated by the exhaust and are directly in line with the incoming mixture. The mixture is deflected upward over them by the shape of the manifold and because of this change in direction, the heavier particles of unvaporized gas are thrown out of the mixture and precipitated on the ribs where the heat of the exhaust vaporizes them. The intake manifold measures 1¾ in. in diameter at all sections, hence the gas velocity is not sufficient to sweep unvaporized particles of the fuel off of the vaporizing ribs. The use of separate exhaust pipes and mufflers for each group of three cylinders prevents the overlapping exhaust from interfering.

One of the features of the lubricating system is the control of the oil pressure by vacuum. When the throttle is nearly closed and the engine is running light but little lubricant is needed. At such times there is a high vacuum in the intake manifold and the vacuum operated piston controlling the oil by-pass valve is raised against spring pressure, thus opening the oil by-pass. The oil pressure is thereby reduced and excessive oiling and smoking are prevented.

The oil pressure regulator is located at the front end of the crankcase immediately over the oil groove in the front main bearing into which the oil passing through the crankshaft is discharged. The plunger, which acts as a valve, extends down into the crankcase to the bearing groove. The piston is located in a small cylinder casting on the outside of the case. This cylinder is connected to the intake manifold. The system operates at a maximum pressure of 40 lb. per sq. in. The oil level in the crankcase is determined by means of a bayonet type gage.

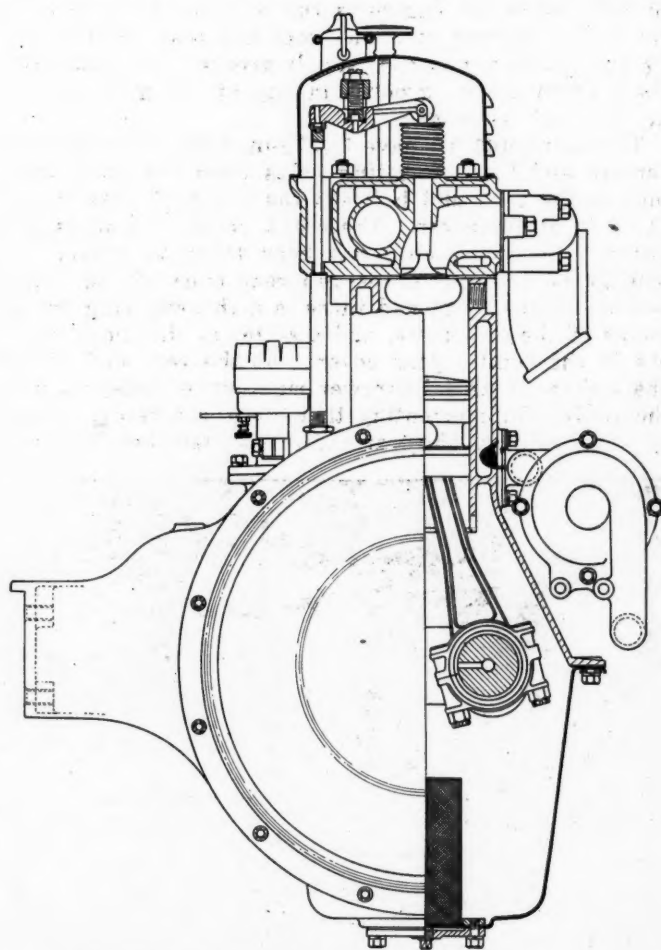
A Rayfield regulator is used for the thermostatic control of the cooling system. The water is circulated by a new type of screw or turbo-impeller pump which gives a good head of water at low speeds and yet does not give excessive circulation at high speeds. The pump is open so that thermal circulation takes place if the pump drive fails. The pump is located at the rear end of the engine and is driven through the electric generator and a small shaft with two fabric universal joints. The water enters the cylinder jacket through a distributor pipe with three outlets, the object being to assure uniform distribution of water with consequent uniform cylinder temperature.

The use of only two timing gears and belt drives for the auxiliary apparatus is quite a departure from con-

ventional practice. It has been found that two gears with 1.25-in. face and a spiral angle of nearly 24 deg. can be made from steel and iron and kept quiet if a third gear is not meshed with them. The gears are rough hobbled and then finished on a Fellows helical gear shaper. The fan, generator and water pump are driven by Graton & Knight 28 deg. V link belts. There are two independent belt drives, one for the fan and the other for the generator. The fan is mounted on an adjustable support, and adjustment for the generator drive is provided for by using a standard S. A. E. mounting for the electric generator, whereby the generator can be swung through quite an arc. This feature makes necessary the two universal joints between generator and water pump.

The new Ansted engine is combined with a transmission forming a unit powerplant and has a new design of multiple disk clutch which is now being made by the Lexington company. It contains five driving and six driven disks. There are ten floating Raybestos moulded friction rings in between the metal disks of saw steel. The Raybestos disks just clear the driven clutch drum so that when the clutch is released they cannot drop into the teeth of the driving member. Teeth of 10-12 pitch are cut on the inside of the driving and on the outside of the driven clutch members. The teeth on the clutch plates and the drums are formed on a Fellows gear shaper.

The most marked change in the chassis is the lengthening of the frame to give a 128-in. wheelbase in place of 120-in. The section of the side frame channel is now practically 9 in. in depth with 2-in. flanges, top and bot-



Transverse section of Ansted engine, showing "rocking chair" type of rocker arm used to increase and decrease valve acceleration in opening and closing



tom. The running boards are bolted to the bottom of the frame, thus giving it additional lateral strength. A cross member is carried from the underside of the running boards across the frame to prevent sag in the running boards and to stiffen the frame. The frame side members are now straight, the frame tapering from front to rear. This makes it possible to rest the body directly on the edge of the frame side members.

Both the emergency and the service brakes are unusual in their construction. The hand brake operates upon a drum located on the rear of the transmission. The foot brake operates on drums attached to the rear wheels, and is in the form of contracting bands. The hand brake is operated through a spring tensioning device so that it is possible to bring the car to a stop with very light pressure. The foot brakes are operated by a cable guided to each rear wheel by a heavy tube attached to the frame. The brake cables pass through loops or guides on the axle tubes and therefore are not affected by the slight rotation of the axle when the brakes are

applied. Fabric universal joints connect the three speed selective gearbox with the rear axle. The drive is Hotchkiss type. The transmission is completely fitted with anti-friction bearings. The counter shaft and spigot bearings are furnished by Hyatt, while the main shaft bearings are New Departure.

The new body lines are very distinctive. The low hung effect of this body is obtained by carrying the doors right down to the frame line and cutting into the body sill to permit the door to shut. Sears-Cross locks are used in all the doors and dowel pins are provided in the side of the sill to hold the doors in position. This design is made possible by the deep, stiff frame.

A triangular instrument board located in the center of the cowl carries the ammeter and oil pressure gage, speedometer, switches and two-way valve for controlling the tilt of the head light.

The schedule of prices is as follows: Seven-passenger touring, \$2985; four-passenger Sedanette, \$4150; seven-passenger Salon Sedan, \$4250.

## Detail Specifications Model T Lexington Car

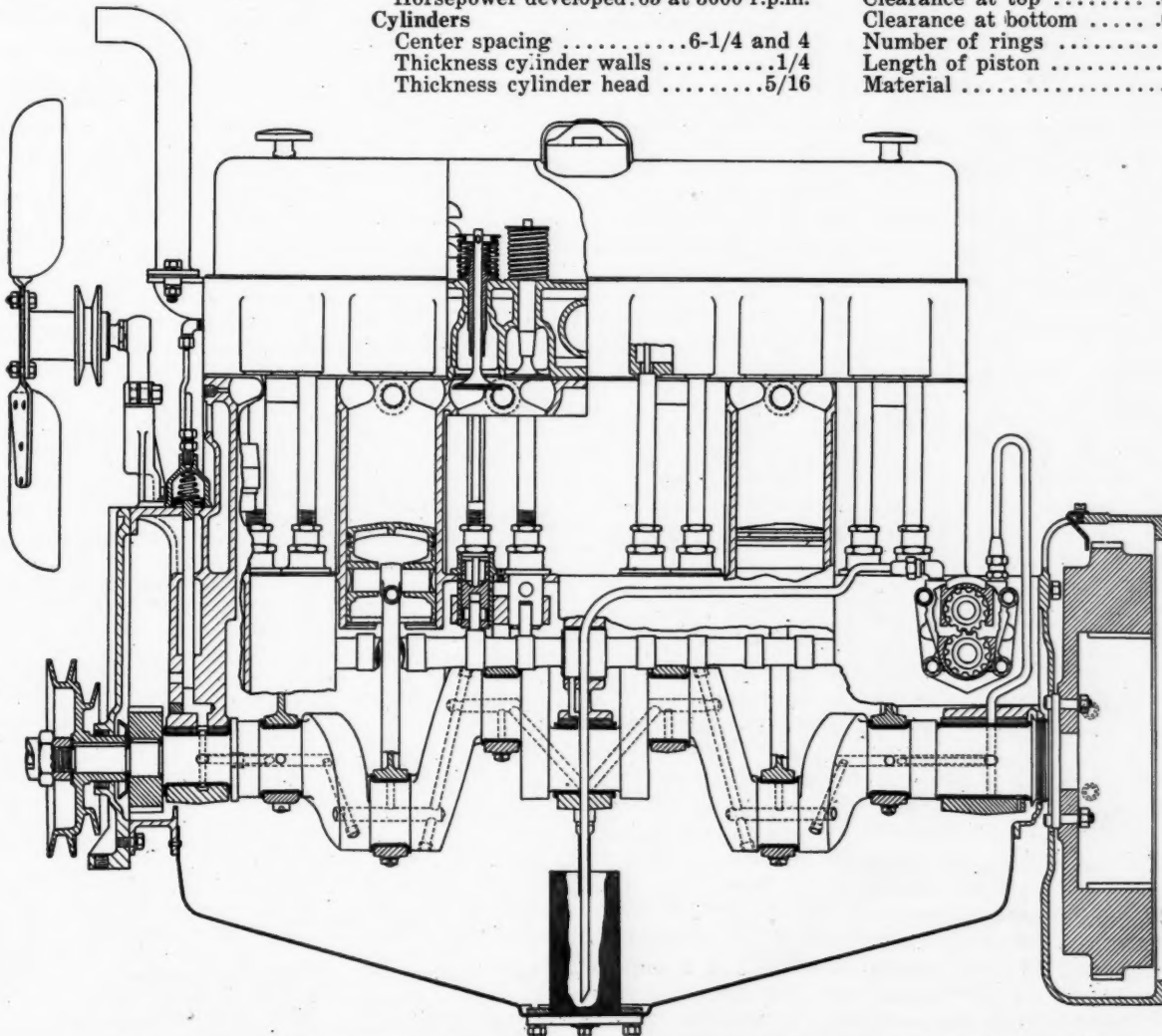
(All Dimensions in inches.)

General	
Bore .....	3-1/4
Stroke .....	4-1/2
Number cylinders .....	6

### Engine

Compression .....	80 lb.
Clearance volume .....	10.5 cu. in.
Piston swept vol. ....	37.3 cu. in.
Total piston displacement ..	224 cu. in.
Horsepower by S. A. E. formula ..	25.39
Horsepower developed .65 at 3000 r.p.m.	
Cylinders	
Center spacing .....	6-1/4 and 4
Thickness cylinder walls .....	1/4
Thickness cylinder head .....	5/16

Thickness water jacket-walls....	3/16
Mean water jacket space .....	13/16
Material .....	Cast iron
Pistons	
Thickness— head, 1/8; walls, 1/16	
Clearance at top .....	.009 to .013
Clearance at bottom .....	.003 to .004
Number of rings .....	2
Length of piston .....	3-17/32
Material .....	Cast iron



Longitudinal section of Ansted engine, showing arrangement of oil pump, and flywheel with internal teeth to mesh with teeth on driven clutch plates

**Piston Pins**

Outside diameter ..... .873  
 Inside diameter .....9/16 to 11/16  
 Material...No. 1020 S. A. E. steel,  
 annealed and case hardened

**Connecting Rod**

Length center to center .....8-1/2  
 Diameter cap bolts .....7/16  
 Thickness of web .....5/32  
 Thickness of flange .....3/16  
 Width flanges .....5/8  
 Material .....D. F. steel

**Crankshaft**

Front b'r'ng...1-3/4 dia. x 2-31/64 long  
 Second b'r'ng...2-1/4 dia. x 2-3/8 long  
 Third bearings...2-3/8 by 3-1/8 long  
 Crankpin ...2-1/4 dia. by 1-1/2 long  
 Cr's sec. long crank arm...3-1/2 x 1-3/4  
 Cr's sec. short crank arm...2-3/4 x 1-1/16  
 Diameter flywheel flange .....4-7/8  
 Thickness flywheel flange .....3/8  
 Material...D. F. steel .40 to .50 carbon

**Crankshaft Bearings**

Thickness of shell .....3/32  
 Material.....Babbitt-bronze back

**Camshaft**

Diameter .....1-1/8  
 Frnt bearing...2-1/8 dia. by 1-1/4 long  
 Second bearing  
 1-3/4 dia. by 1-1/2 long  
 Third bearing .....1 dia. by 2 long  
 Diameter gear flange .....3  
 Width of cam face .....5/8  
 Radius follower circle ......8437  
 Material...D. F. steel No. 1020 S. A. E.  
 Material camshaft bearing  
 Phosphor bronze S. A. E. No. 26

**Valves**

Clear diameter .....1-5/8  
 Diameter of valve stem... .310 to .311  
 Lift ......415  
 Material .....E. W. P. alloy

**Valve Springs**

Total load—main spring...45 to 50 lb.  
 Total load aux. springs...23 to 28 lb.  
 Material .....Round steel spring wire

**Timing Gears**

Pitch .....10  
 Width of face .....1-1/4  
 Number of teeth in crankshaft gear.33  
 Material of crankshaft gear...C. R. S.  
 Number of teeth camshaft gear...66  
 Material camshaft gear .....C. I.

**Flywheel**

Pitch diameter .....15.750  
 Width .....3-9/32  
 Thickness of web .....1/2  
 Teeth .....126—8-10 pitch  
 Face .....1-1/8  
 Material .....Semi-steel

**Crankcase**

Thickness side walls .....3/16  
 Thickness top .....3/16  
 Thickness legs .....3/16  
 Thickness ends .....1/4  
 Material .....Cast iron  
 Cast integral with cylinder block

**Water Pump**

Diameter of paddle....3.994 to 3.996  
 Width of paddle .....499 to .501  
 Number of blades .....10  
 Material .....Red brass

**Radiator**

Area front .....375 sq. in.  
 Thickness .....2-3/4 in. core  
 Capacity water system .....17 qt.

**Carbureter**

Make .....Rayfield  
 Size .....1-1/2 horizontal

**Clutch and Transmission****Clutch**

Diameter of disk .....8-5/8 in.  
 Number of disks .....10  
 Width of facing .....1-1/16  
 Thickness of facing .....1/8  
 Material facing .....Thermoid  
 Spring pressure .....240 to 270 lb.

**Transmission Gears**

Const. mesh primary .....15 teeth  
 Const. mesh secondary .....27 teeth  
 Low speed primary .....27 teeth  
 Low speed secondary .....15 teeth  
 Second speed primary .....20 teeth  
 Second speed secondary .....22 teeth  
 High speed, telescoping.....15 teeth  
 Reverse primary .....12 teeth  
 Reverse idler .....17 teeth  
 Pitch of gears .....6-8  
 Width of gear face .....3/4  
 Material of gears...Oil hardened steel

**Reduction in Transmission**

Reverse .....4.05 to 1  
 Low .....3.24 to 1  
 Second .....1.636 to 1  
 High .....Direct

**Total Reduction**

Reverse .....18.73 to 1  
 Low .....14.98 to 1  
 Second .....7.56 to 1  
 High .....4.625 to 1

**Shafts**

Diameter primary shaft (six spline)  
 1.475  
 Material primary shaft  
 S. A. E. steel No. 1045  
 Diameter section secondary shaft  
 1.188  
 Material secondary shaft  
 S. A. E. steel No. 1045

**Bearings**

Primary drive shaft, front  
 No. 1209 ball bearing  
 Primary drive shaft, rear  
 No. 306 ball bearing D. R.  
 Secondary shaft, front  
 Hyatt roller bearing  
 Secondary shaft, rear  
 Hyatt roller bearing  
 Reverse shaft .....Bronze bushing

**Rear System****Axle Housing**

Thickness center section .....3/8  
 Diameter center section .....12-7/8  
 Thickness tubes .....3/16  
 Diameter tubes .....2-41/64  
 Distance between spring centers.41-1/2  
 Material of housing .....Pressed steel

**Shafts**

Diameter of propeller shaft.....1-3/4  
 Material .....Nickel steel tube  
 Diameter of live axles .....1-3/8  
 Material .....No. 3125 S. A. E. steel

**Driving Pinion**

Pitch .....3.47  
 Face .....1-5/16  
 Number of teeth .....8  
 Material .....Steel forging

**Ring Gear**

Pitch .....3.47  
 Face .....1-5/16  
 Number of teeth .....37  
 Ratio .....4.625 to 1  
 Material .....Steel forging

**Differential Pinions**

Pitch .....5.7  
 Face .....11/16  
 Number of teeth .....10  
 Material .....Steel

**Differential Gear**

Pitch .....5.7  
 Face .....11/16  
 Number of teeth .....18  
 Material .....Steel

**Brakes**

Diameter of service (foot) brakes.16  
 Width of service brakes .....2  
 Diameter emergency (hand) brake...8  
 Width emergency brake .....2  
 Material lining..Compressed Thermoid  
 Material brake drum...Pressed steel

**Bearings**

Hubs .....No. 310 S. Row Ball  
 Differential, r. and l...No. 210 R. & T.  
 Driving pinion, rear...No. 305 Radial  
 Driving pinion, front...No. 406 R. D. T.

**Hubs**

Diameter flange .....8-1/4  
 Thickness flange .....1/4  
 Material flange .....Mall. iron  
 Diameter bolt circle .....6-3/4  
 Number of bolts .....6  
 Diameter of bolts .....11/16

**Front Axle****Front Axle Forging**

Depth of center web .....2-1/4  
 Width of flanges .....1-1/2  
 Thickness of web .....3/16  
 Distance between spring centers.28-1/2  
 Distance c. to c. king pins.....51-3/4  
 Material .....D. F. steel

**Steering Knuckles**

Diameter of spindle—maximum.2-1/4  
 minimum... .786  
 Material .....D. F. steel

**King Pin**

Length of king pin .....6-29/64  
 Diameter of king pin .....3/4  
 Material .....No. 1020 S. A. E. steel

**Front Wheel Bearings**

Inside hub bearings .....No. 308D. R.  
 Outside hub bearing ....No. 304 S. R.

**Front Wheel Hub**

Diameter of flange.....7-1/2  
 Thickness of flange.....1/4  
 Material of flange.....Mall. Iron  
 Diameter bolt circle.....6  
 Number of bolts.....10  
 Diameter of bolts.....3/8

**Frame, Springs, Etc.****Side Rails**

Depth of channel.....7-3/4  
 Width of flanges.....1-1/2 to 3  
 Thickness of stock.....1/8  
 Overall width (of frame)  
 23-3/8 to 45-1/2  
 How fastened .....Hot riveted  
 Material .....Pressed steel

**Cross Members**

Number of cross members.....3  
 Thickness of stock.....1/8  
 Material.....Pressed steel

**Steering Gear**

Diameter wheel.....18  
 Diameter steering shaft.....1-1/8  
 Number of teeth in gear.....17  
 Pitch .....5/8  
 Length of steering arm.....7-1/2

**Springs**

Length of front spring.....34  
 Width of front spring.....2  
 Number of leaves in front spring...7  
 Length of rear spring.....56  
 Width of rear spring.....2  
 Number of leaves in rear spring...10  
 Material—Front, Vanadium steel;  
 Rear, Carbon steel

**Wheels**

Front wheel (tire size)...34 by 4, cord  
 Number of spokes in front wheel...10  
 Width of spokes in front wheel...1-3/8  
 Rear wheel (tire size)...34 by 4 cord  
 Number of spokes in rear wheel...12  
 Width of spokes in rear wheel...1-3/8

**Fenders**

Width of front fenders.....10  
 Width of rear fenders.....10  
 Thickness of material

No. 20 U. S. G. (.038)

Material.....Pressed steel

**Gasoline Tank**

Where located .....Rear  
 Main supply.....17 gal.  
 Thickness of material...No. 20 gage  
 Material.....Pressed steel



# Putting the Factory to Work on Service Jobs

Most factories have idle equipment and space. All lines of vehicles need more and better service. Here is a suggestion which, if applied, will enable manufacturers to use both space and equipment advantageously.

By Clyde Jennings

**T**HE idea that service is the biggest single factor affecting the future of automotive transportation is gradually gaining recognition. New ideas for organized service and a realization that manufacturers must be responsible for the service in recognized shops and that it is their obligation to better the service in all shops (and do their utmost to eliminate the "gyp") are developing.

But the mail brought the other day an announcement which we believe will have a widespread influence for good. Also it probably will provide employment for some idle factory space and equipment. The idea is so good that we are going to pass it on. It is well worth the manufacturers' consideration. Here is the communication:

There is a popular idea that after four or five years' use a motor truck must be sold to the junk dealer. This is entirely wrong and a very wasteful theory.

We all know that there is a large number of the component parts of a good motor truck which really never wear out, or on which the wearing parts can be easily renewed. Such parts as the following represent quite a large proportion of the value of a truck, and are just as good at the end of four or five years as they were to begin with: Axles, wheels, frame, frame castings, gasoline tank, steering gear, radiator, carburetor and magneto, transmission case, clutch housing, etc.

Motors with a large number of moving—and consequently wearing—parts, need overhauling and replacement from time to time as is only reasonable. Tires of course have to be replaced, and springs will eventually lose their life. Transmission gears may wear and need replacement. But there is no justification for practically throwing away so much valuable material that doesn't wear out at all.

The work of RECONDITIONING a used truck is a much bigger proposition than what we usually mean by an annual overhauling, and can only be properly undertaken by the factory that originally built the truck.

RECONDITIONING calls for the following:

1. All cylinders to be rebored and standard oversized pistons fitted, with the understanding that if the motor needs a very large number of new parts in order to put it in first-class shape, with a consequent considerable cost, in some instances it is more advisable to install a complete new engine.
2. Brand new tires should be fitted on all wheels.
3. All springs should be renewed, and all parts including transmission gears that are not as good as new should be replaced by new parts.
4. The testing of a RECONDITIONED truck should be as exhaustive in all respects as the testing of a new machine.
5. The factory should give its original guarantee as given on a new truck covering any machine RECONDITIONED at the factory.

You are doubtless aware that in locomotive practice locomotives are RECONDITIONED at regular intervals, and by this means the life of the railway locomotive is almost indefinite, some engines being in active service for twenty or thirty years. The same policy is applicable to trucks.

The work of general overhauling a truck can be handled by our dealers, but the work of RECONDITIONING, which is quite different, is a factory operation. It begins with the entire dismantling of the chassis and the inspection of all parts, the rejection of those that are imperfect and their replacement by new parts, the reassembling of the chassis and the same road test and final inspection and factory guarantee as goes with a new machine.

The result of this is that the RECONDITIONED machine goes back to its owner ready to make a fresh start.

We are prepared to undertake this work at the factory and on trucks owned in the vicinity of Detroit, we are prepared to give immediate estimates of the cost of such work, and on trucks that are located at a distance from Detroit, we are willing to send an expert to inspect and make an estimate, providing that if the truck is sent to us for RECONDITIONING we will make no charge for the time and expenses of our expert's appraisal, but if it is decided not to have the work done, we will expect our customer to pay the traveling expenses only occasioned by our expert's trip.

The railroads are moving freight very freely at the present time and trucks can be shipped into Detroit from a radius of 500 to 1000 miles at a freight expense of probably not more than from \$50 to \$100 each way, and under existing conditions the railroads will deliver them to us quickly and they will get back to you quickly when we ship them out again. We invite immediate correspondence on this proposition, as it is difficult to cover it fully in one letter, but all Acason owners will, we are sure, appreciate the economical possibilities of the plan herein outlined.

In some cases when desired trucks of previous years' models can be reconstructed and brought up to the specifications of our 1920 new series with 4-speed amidships transmission, etc.

Particulars of our recommendations on these points can be given to each individual owner.

ACASON MOTOR TRUCK COMPANY.

This idea can be applied to other vehicles than trucks. Before the big manufacturing rush came, a motor car factory located outside the Detroit district had excess paint shop space except in the very busy season. It was the practice of this factory to solicit among its dealers painting jobs. The amount of such work sent to the factory was surprising. Cars were driven several hundred miles for this work and many owners who had refused to listen to the solicitor who wanted to repaint the car in a dealer's shop gladly accepted the invitation to have the vehicle repainted in the factory.

Probably the belief that the vehicle would be better painted in the factory was unfounded, but it existed. While the chassis was waiting for the painting, it was examined, a statement of condition, the price for making needed repairs and any advice the factory experts saw fit to give. This became a source of considerable revenue, helped small dealers and had a good effect on owners.

# A New Dual Reduction Truck Axle

Latest model of Mack truck uses Hotchkiss drive and novel spring mounting. Emergency brake on propeller shaft and service brakes on wheels. Makers consider dual reduction superior to worm drive, which is discontinued. Continue chain drive model, regarded best of three types.

By P. M. Heldt

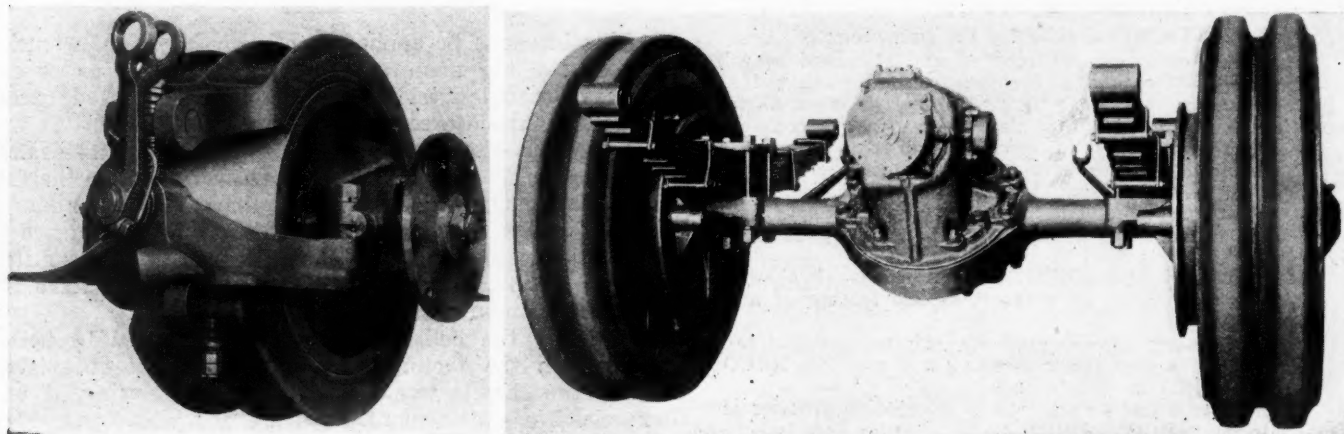
**C**HAIN drive for motor trucks has one ardent supporter in the American truck industry—the International Motor Co., manufacturers of Mack trucks. The large trucks of this company always have been fitted with chain drive exclusively, while the smaller trucks, known as Model AB, have been built with either chain or worm drive, at the customer's option, for the past several years. The company has never been very enthusiastic about the worm drive, but in view of the public demand for shaft drive, it furnished worm drive trucks when asked for. Ever since the introduction of the AB truck, the engineering staff of the company has been making a study of different forms of shaft drive, both European and American, and has built and tested various experimental rear axles. It has now decided to discontinue the worm drive and to offer instead a dual reduction drive axle. The chain driven AB model will also be continued.

The dual reduction axle has a drop-forged housing of the double banjo type, and this is said to be the only drop forged axle housing extending from hub cap to hub cap that is made in America to-day. The yoke at the center of the axle housing is placed at an angle of 45 deg. instead of vertically or horizontally. This brings the plane of greatest strength of the housing substantially parallel with the direction of the severest shocks on the axle, and has the further advantage of increased road clearance. Incidentally this arrangement of the rear axle yoke places the gear train at an angle and produces a straight line drive. A double reduction axle is naturally somewhat heavier than a worm driven axle, and in order to reduce this extra weight to a minimum, the gear carrier and cover plate, which are secured to opposite sides of the yoke of the axle housing, are made of aluminum alloy. As is customary in such axles, the first re-

duction is by a pair of bevel gears, and the second by a pair of spur gears, the spur ring being mounted on the differential. The spur pinion is formed integral with the jackshaft, and the bevel gear is mounted thereon in a most secure manner. All of the shafts in the rear axle are mounted on Timken tapered roller bearings. The bevel pinion shaft is supported by a cast steel carrier, which is bolted to the aluminum gear carrier. All bearing adjustments are made with the aid of shims. That is, instead of having a screw adjustment locked by means of a dog or key, the adjusting collar is screwed up tight against shims, and if it is desired to make an adjustment one or more of the shims have to be removed. This same method of adjustment is used on the jackshaft on which the bevel gear is mounted. All bearing adjustments can be made without disturbing the assembly of the parts, and either the differential, jackshaft or pinion-shaft can be removed without disturbing any of the other parts.

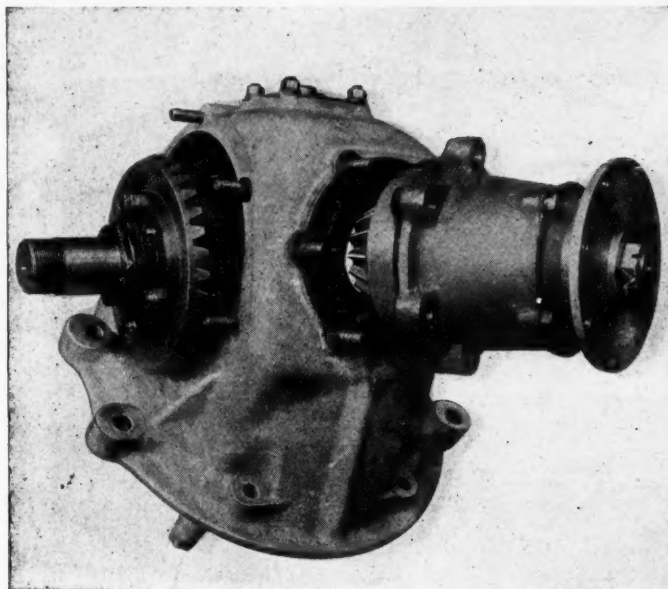
The gear carrier is held in position on the rear axle housing by four studs passing through the metal of the yoke. These studs serve also to hold the cover plate in position. In addition to these four studs, there are four bolts which pass through the flanges of the gear carrier and the cover plate but not through the metal of the axle housing. They serve to distribute the holding down pressure uniformly over the flange of the gear carrier. The axle housing is forged of chrome nickel steel, with the wheel spindles and the spring saddles integral. The driving shafts are of chrome vanadium steel.

The Hotchkiss drive being used, it was thought necessary to provide exceptionally heavy springs and the most secure fastenings for same to the axle housing. In this connection the integral spring saddles of the axle housing offer quite an advantage. The spring is held to the sad-

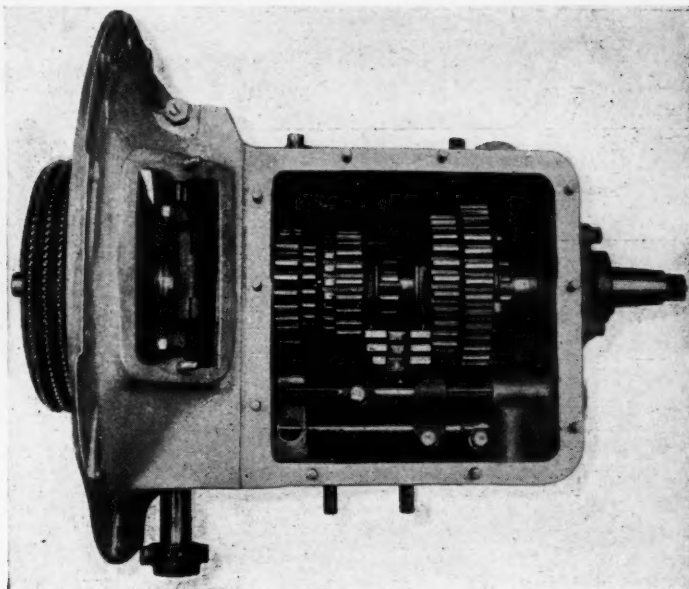


To the left—Substantially constructed transmission brake, provided with bearings in each side, and heavy drop-forged shoes. To the right—Rear axle assembly, showing inclined position of banjo housing





*Assembly of gear reduction in separate housing bolted to rear axle. Note facility with which units are dismantled*



*Transmission and clutch. Interrupted spline construction used to give greater rigidity and ease in sliding of gears*

dle by means of four heavy studs, which pass through the saddle and through a spring pressure plate, and are provided with 1 in. nuts at the bottom of the spring saddle. As the driving thrust is transmitted through the springs, there is a considerable tendency to displace the spring lengthwise relative to the saddle. It was not thought expedient to rely on the center bolt of the spring to take care of this thrust, as is often done. Instead, the main leaf was formed with a circular ridge around the center bolt hole, which mates with a counter-sunk slot in the spring pressure plate. There is a similar slot at the center of the spring saddle, and a corresponding circular ridge on the bottom of the smallest leaf.

The Hotchkiss drive, of course, imposes increased load on the springs and all parts thereof, and this has been taken fully into account in the design of the axle. The spring eyes are  $1\frac{1}{4}$  in. in diameter and are provided with self-lubricating bushings. At the forward end the spring bolt is supported in the bracket at both sides of the spring. There are two rebound clips on each side of the axle, and the bolt of each clip passes through an eye formed on one of the intermediate leaves, the clip being free on the spring, so as not to interfere with the spring action. The rear springs are 54 in. long and  $3\frac{1}{2}$  in. wide.

An oil filler is cast onto the cover plate of the axle housing, and this serves also as a level gage in filling the axle with oil. For the lubrication of the bevel pinion shaft bearings, an oil trough is cast in the upper part of the housing, into which oil is thrown by the revolving differential and crown gear. This oil flows by gravity through a suitable passage to the bearings. The road clearance is  $10\frac{1}{4}$  in.

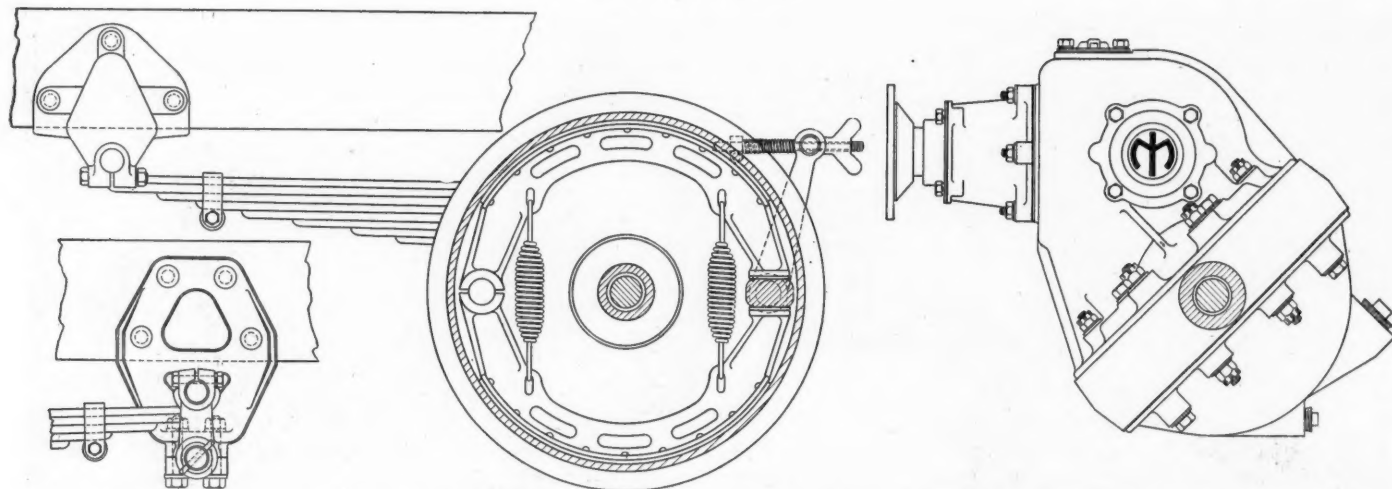
Four different gear ratios are offered with the dual reduction axle, viz.,  $5\frac{7}{8}$ , 7.6,  $9\frac{1}{4}$  and  $10\frac{3}{4}$ . A change in gear ratio is quite easy to make, as the axle does not have to be dismantled, nor the adjustment of the differential disturbed. The only gears affected are the bevels, and only two new parts are required to get a new gear ratio, viz., the pinion shaft and the bevel gear. The pinion shaft is removed from the front and the jackshaft through the side. The new pinion shaft is installed and a new bevel gear substituted for the old one on the same jackshaft, by means of six bolts.

The adoption of the dual reduction axle has been accompanied by several other changes in design. One of

the most noteworthy is in connection with the brakes. The truck is provided with a transmission brake and two rear wheel brakes, but, contrary to ordinary practice, the rear wheel brakes are the service brakes and the transmission brake is the emergency brake. The result of this is that ordinarily the braking effort is applied directly to the wheels and does not have to be carried through the transmission gear. Another reason for making the rear wheel brake the service brake is that with a given effort the driver cannot produce such a strong braking effect with the rear wheel brakes as with the transmission brake, and he is therefore less likely to abuse the tires.

The transmission brake is mounted on a short shaft carried on a one-piece drop forged frame, which completely surrounds the brake drum and is bolted to two cross members. The propeller shaft, therefore, is really in three sections, and four universal joints are used. These joints are much larger than those heretofore used by the International Motor Co., and the strain on them is correspondingly reduced. The transmission brake is 11 in. in diameter and 6 in. wide. It is of the contracting type, the sectors consisting of heavily ribbed drop forgings to which asbestos lining is secured by flat head screws. Each brake covers only about 100 deg. of the drum circumference, this comparatively small angular span having been found desirable to prevent excessive wear at the ends of each sector. The lining of each sector measures 6 x 12 in. The brake is operated by means of a double armed lever, whose axis extends across the chassis frame, the two arms being linked to the upper sector on one side and to the lower sector on the other side of the center. All bearing surfaces on the operating mechanism are liberal.

The new dual reduction AB truck will share with the chain driven model a number of other improvements, such as the new engine crankcase having 3 gal. oil capacity, as compared with  $1\frac{7}{8}$  gal. on the old engine, and the new Mack unit powerplant clutch and transmission, both built complete in the New Brunswick plant. In general design, this transmission is similar to the stock transmission formerly used, but it incorporates a number of improvements. The main shaft is splined, the splining being of the interrupted type, in which the gears are guided on ground surfaces between two sets of splines. This is said to give a much easier sliding action and



Spring anchorages, rear wheel brake and side elevation of rear axle. Note inclined position of differential housing

greater rigidity. The case is larger and holds more lubricant. An extension counter-shaft with a keyed power take-off is standard equipment. The standard S.A.E. tire pump mounting is provided on the side of the case to receive a pump for the inflation of pneumatic tires. The control has been simplified by the elimination of the reverse latch trigger. Instead, the lever is one solid piece, and the reverse lock is released by depressing the entire lever.

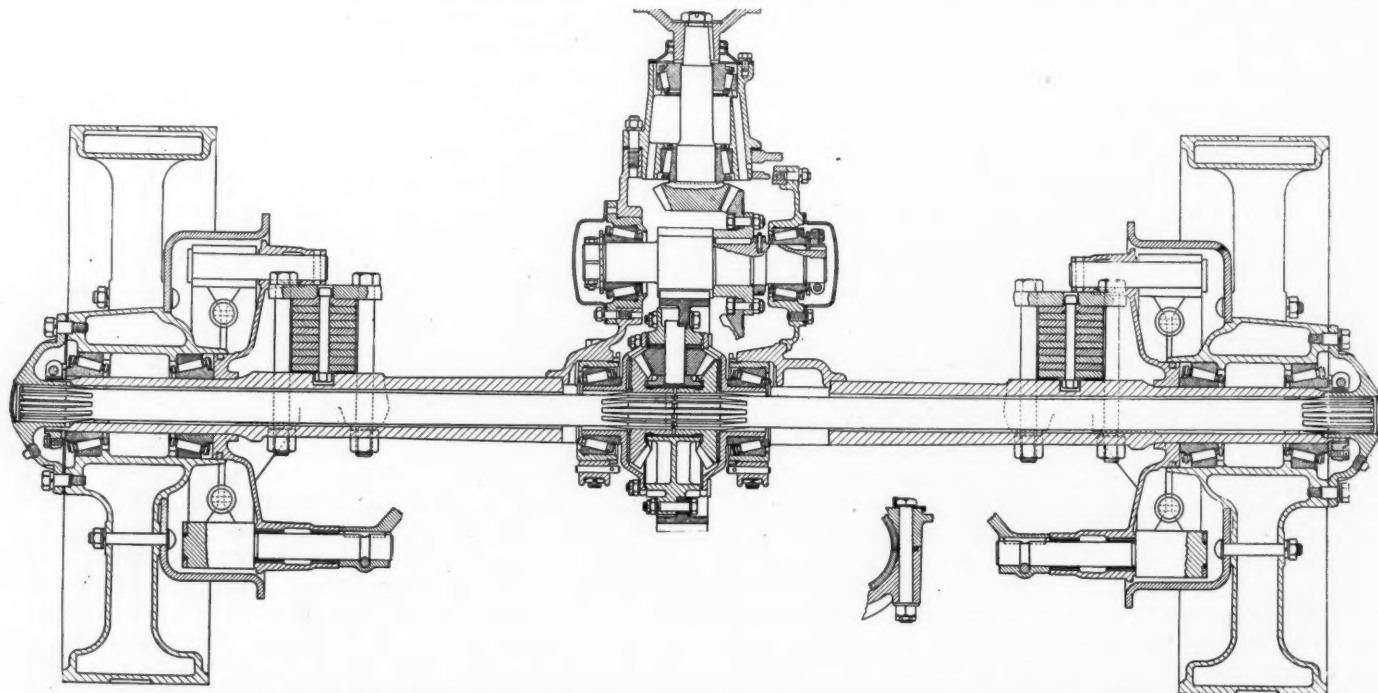
A demonstration of three Mack model AB trucks was given before a number of trade paper representatives in the upper part of New York City on Dec. 15. The three trucks were equipped with chain, worm and dual reduction drive, respectively. They were all built to the same specification as to weight (approximately 5800 lb.), power delivered to the final drive, and gear ratios, the motors all being governed to 1275 r.p.m.

It was announced at the trial that one of the three engines had shown slightly greater power than the others and this had been put in the worm drive truck. The total reduction ratios were alike to within one per

cent. (two being 9.25 and one 9.20). In each test three trials were made, with different drivers, so as to eliminate the personal equation. In the first test the trucks were allowed to coast down a slight incline with gears in neutral and all brakes released, and to run themselves out on the level at the bottom of the decline. Both the distance coasted on the level and the time from the start to the stop were measured. The results, averaged, were as follows:

Truck type.	Distance coasted on level.	Time from start to stop.
Chain .....	49 ft. 2 in.	1 min. 16 sec.
Worm .....	26 ft. 7 in.	1 min. 57 sec.
Dual red.....	45 ft. 2 in.	1 min. 16 sec.

In the second test, held on Exterior Street, the Bronx, the trucks were started from a point at the bottom of a hill averaging 16 per cent for its entire length of 80 yards, there being one point, about 30 yards from the top, where the grade is 18 per cent. The three trucks were started from the bottom of the hill, one at a time. Each was put



Horizontal section through rear axle, showing mounting and arrangement of bevel and spur gears in double reduction



in second gear as soon after the start as possible, and note was taken of the points where the drivers were forced to shift back to first gear. The time taken for the complete ascent of the hill was also taken. The results, averaged, were as follows:

	Distance to shift	Time to shift to 1st speed.	Elapsed time.
Truck type.			
Chain . . . .	153 ft. 5 in.	29.6 sec.	51 sec.
Worm . . . .	16 ft. 7 in.	5.6 sec.	57 sec.
Dual red. . .	104 ft. 5 in.	22.3 sec.	52.6 sec.

In the third test all of the trucks were run, one at a time, part-way up the hill and left standing for 2 min. in order to allow the oil to drain off the gears of the final drive. The drivers were then given the signal to start and to ascend the hill as quickly as possible, notations being made of any changes in gear. All three trucks ascended the hill on first gear, the chain driven truck requiring 31 sec., the worm truck 32 sec., and the dual reduction truck 31 sec. A speed and acceleration test was made on a level course on Anderson Avenue, from Jerome Avenue north to West 162d Street. The trucks were started from a line, one at a time, and were accelerated as fast as possible, the distance and time in which the maximum speed was reached being noted. There was an observer on each truck, and the governor cover had been removed, so as soon as the observer noted the gov-

ernor closing on direct drive—which showed that the maximum truck speed had been reached—he would pull a string and a vertically arranged chalk pistol on the truck frame would discharge, making a white mark on the roadway, so that the distance from the starting point could be accurately measured. The results with the three trucks, averaged for three trials, were as follows:

Truck type.	Time to full accel- eration.	Distance to full accel- eration.	Elapsed Time.
Chain . . . .	14.3 sec.	174 ft.	21.3 sec.
Worm . . . .	16.7 sec.	190 ft. 1 in.	21.6 sec.
Dual red. . .	15.3 sec.	181 ft. 2 in.	21.6 sec.

The fifth test was an obstacle test, the truck being backed up to a 6-in. curbstone, and an endeavor made to lift the rear end over the obstacle without rolling or bumping. The chain driven truck was lifted over the curb three times in succession without difficulty. The worm driven truck would not climb the curb without bounce, while the dual reduction went over without any great difficulty. In the final test the three trucks were hitched through a dynamometer to a truck anchored in the roadway, and the maximum drawbar pull which the trucks were capable of exerting was observed. Three successive attempts were made with the trucks, and the drawbar pulls registered, averaged, were as follows: Chain, 3700 lb.; worm, 2633 lb.; dual reduction, 2833 lb.

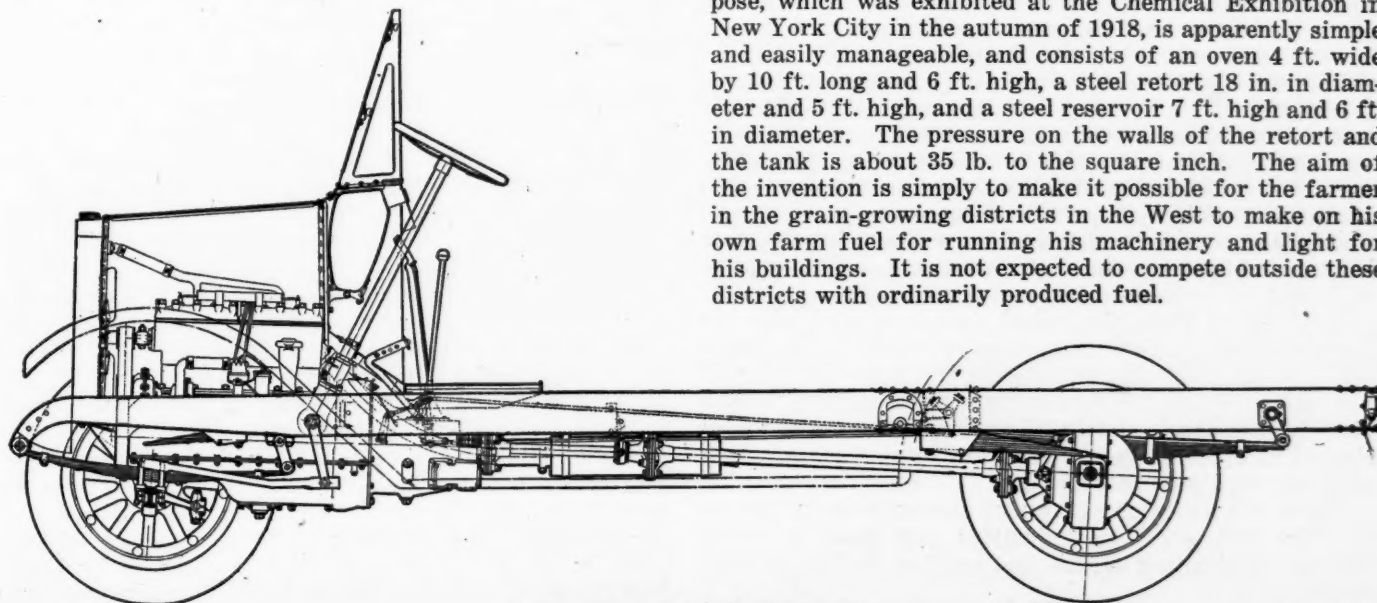
## A New One-Ton Speed Truck

A NEW commercial car, designated the Akron multi-truck, will be turned out by the Thomart Motor Co. It is of the speed truck type, with pneumatic tire equipment (34 x 5 in. cord) and has a rated capacity of 1 ton. The engine is a four cylinder block type, 4½ x 5 in., with force feed lubrication and three point suspension. The clutch is a dry disk type and the gearset affords three forward speeds. Unit powerplant construction is used. The propeller shaft is made up in two sections with three fabric universal joints, the central joint being supported by a floating ball bearing. The rear axle is a semi-floating spiral-bevel-gear driven type, and the Hotchkiss drive is used. The frame is of pressed steel, the channel section being 5⅞ in. deep. In addition to the primary set of semi-

elliptic springs there are quarter-elliptic auxiliary springs secured to the under side of the frame channels, the free ends of which come down on the spring pressure plates when the truck is heavily loaded. The truck has a wheelbase of 133½ in. and has a speed of 30 to 35 m.p.h. It comes regularly equipped with Westinghouse electric generator and starter. A one year guarantee is given.

### Motor Fuel from Straw

COMMENTING on press reports relative to the production of gas and motor fuel for lighting and power purposes from straw, the British Commercial Counsellor in Washington states that the apparatus for this purpose, which was exhibited at the Chemical Exhibition in New York City in the autumn of 1918, is apparently simple and easily manageable, and consists of an oven 4 ft. wide by 10 ft. long and 6 ft. high, a steel retort 18 in. in diameter and 5 ft. high, and a steel reservoir 7 ft. high and 6 ft. in diameter. The pressure on the walls of the retort and the tank is about 35 lb. to the square inch. The aim of the invention is simply to make it possible for the farmer in the grain-growing districts in the West to make on his own farm fuel for running his machinery and light for his buildings. It is not expected to compete outside these districts with ordinarily produced fuel.



The Akron 1-ton truck chassis

# Significance of Alcohol in the Motor Fuel Problem

The probable shortage of gasoline and the limited capacity of the country for the production of alcohol and benzol renders desirable the use of a synthetic fuel containing all three constituents. Data on the characteristics and advantages of such a fuel are set forth in this article.

By Burnell R. Tunison\*

**T**HE growth of the petroleum industry has been nothing short of phenomenal, but the production of gasoline has been made to keep pace with the automotive industries, only with the greatest difficulty. The production of crude petroleum has increased about 90 per cent during the last ten years. Due to better refining methods; to casinghead gasoline; to cracking processes and other contributing factors, the production of gasoline during the same period has increased approximately 550 per cent. According to the United States Bureau of Mines during the year 1918 the production of this fuel was over 3,570,000,000 gal. and in 1919 the production was nearly 4,000,000,000 gal.

The National Automobile Chamber of Commerce states that last year the volume of the automotive business was represented by the prodigious sum of \$3,166,834,600. This is surely one of our major industries involving an invested capital of over a billion dollars, employing 300,000 persons who receive annually approximately \$375,000,000. There were 7,500,000 motor vehicles in use this year, or one to every fourteen persons in the country. Assuming an average motor car mileage of 3,000, the total mileage is 22,500,000,000 miles per annum. If each motor vehicle carried an average of three persons the total passenger mileage was 67,500,000,000. The total passenger mileage of all our railroads during 1919 was 46,145,070,650.

In two years the end point of the average gasoline has been raised from 392 deg. F. to 425 deg. F., or an increase of 33 deg. F.

The United State Geological Survey is authority for the statement that the petroleum resources of the country have been depleted to the extent of approximately 40 per cent, and that the remaining six and one-half billion barrels at the present rate of consumption will last only sixteen to eighteen years. But the rate of consumption will continually increase.

There is unanimous agreement among those in the automotive and petroleum industries that there is a real internal combustion engine fuel problem before us now.

It is clearly evident that unless some partial solution of this problem is found the progress of the automotive industries will be seriously impaired. This would be a disastrous blow to the economic equilibrium of the nation.

Now that the problem is generally recognized, what are some of the possible remedies which may assist in its solution?

It has been said that benzol and coal tar products will assist. Even under war time stimulation the production of distillates suitable for motor fuel amounted to less than 75,000,000 gal. At present, if all these products were used as motor fuel, which is impossible because of their many other important uses, the fuel thus made available would be less than 100,000,000 gal. per year.

Alcohol has real value as a motor fuel. That it has not been a factor in America up to the present time has been due to an economic condition rather than to inherent difficulties in its use.

Some of the conclusions of the Department of Agriculture on the use of alcohol are:

1. The ordinary engine can be run on alcohol without material change.
2. When run on alcohol, operation is more nearly noiseless than when run on other fuel.
3. For air cooled automobile engines, alcohol is especially suitable as a fuel.
4. The fuel consumption is affected by the time of ignition, by the speed and by the initial compression of the charge.
5. The economy is better at low than at high speeds.
6. The average engine will give about 10 per cent more power when burning alcohol but at the expense of a greater fuel consumption. Twenty per cent more power can be developed by especially adapting the engine to the fuel.

The time is not far distant when alcohol must become a factor as a motor fuel. That alcohol cannot meet the situation at once is readily seen from a consideration of our present alcohol production. If the alcohol producing capacity of the country were to be utilized for motor fuel purposes only 100,000,000 gal. annually would be made available.

\*From a paper read before the Washington Section of the American Chemical Society.



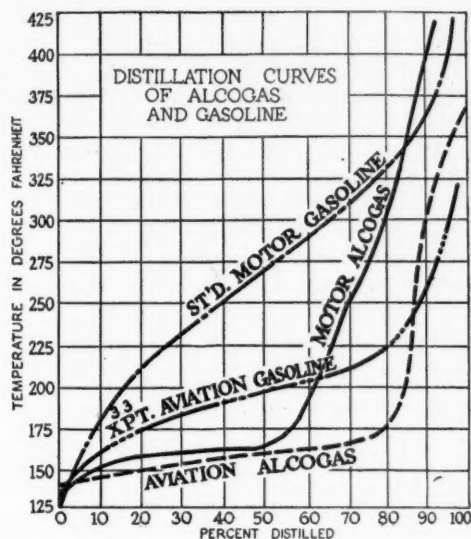


Fig. 1

The combined coal tar distillate and alcohol production of the nation would amount to less than 5 per cent of our motor fuel requirements. There is a limit to the quantity of coal tar distillates which can be produced. We have not yet realized that limit and larger quantities of coal should be carbonized in by-product recovery ovens so that these distillates will be available for motor fuel purposes.

We can and must make more alcohol. This necessity is not dependent upon natural reservoirs or deposits. We all realize that alcohol can be produced from any material containing starch or sugar. Even large quantities of waste cellulose material can be utilized for the production of alcohol for motor purposes.

#### The Present Solution

Knowing that no one remedy is going to be the solution of the problem, consideration should be given to the various factors contributing to it. There must be a complete co-operation between the designer and builder of automotive apparatus, the user, and the industries which supply the fuel. The designer and the builder should sacrifice power, speed and accelerating ability for efficiency. The motor car of the future should run the greater portion of the time at nearly full load conditions in order to secure the maximum efficiency. There should be material reduction in the weight of car and engine parts and a more logical proportioning of engine speed to car speed. The user should not demand high speed and rapid acceleration. He should be willing to change gears more frequently.

The producers of motor fuel should co-operate to produce a fuel which permits of higher compression ratios without the difficulties of "knock." Higher compression ratio means not only greater thermal efficiency but less weight per unit of power; and by proper design the possibility of smaller engines.

It has been conclusively demonstrated by prominent automotive engineers that the present day motor fuel is far from ideal and has very serious limitations. Efficiency is now demanded and high efficiencies are not possible with our present fuel.

Petroleum products, benzol, or alcohol when used alone are not entirely satisfactory. Each possesses distinct advantages when used in internal combustion engines. Alcohol and benzol both have certain disadvantages which will preclude their use alone in the engines of the near future. It is possible, however, to make a combination

of these fuels in such a manner as to derive the natural advantages of the several components. Such a fuel including gasoline and some of the heavier distillates would indeed be a step forward.

Benzol and similar coal tar distillates possess desirable properties as motor fuels. They can be used in high compression engines and there are few detonation difficulties. In an engine cylinder benzol ignites slowly and burns in such a manner that detonation does not take place. Large quantities of carbon are formed, however, which render it undesirable, when used alone. The freezing point of benzol when not mixed with other fuels is 40 deg. F. This renders unmixed benzol unsuitable for winter use. Its use with petroleum mixtures is also undesirable inasmuch as petroleum distillates have little controlling influence over the physical or chemical properties of the benzol mixed with them.

On the other hand, it is possible to make mixtures of alcohol and benzol which show very remarkable properties. The presence of the alcohol has a marked effect on the freezing point of the mixture as well as on the formation of carbon.

Alcohol is one of the most stable fuels known, but in order to obtain best performance with it alone it is essential to use engines with very high compression ratios. The fact that alcohol has a latent heat of evaporation of 385 B. T. U. per pound as compared to 170 B. T. U. per pound for benzol and approximately 190 B. T. U. per pound for gasoline, renders it unsuitable for starting an engine in cold atmospheres. Furthermore, the low vapor pressure of alcohol as compared to other fuels makes it difficult to use in low temperatures unless blended with other components. Alcohol starts to burn very rapidly in an engine cylinder, but does not increase its rate of combustion as do the petroleum products. It can be readily seen that when alcohol is carefully blended with other fuel components which possess the qualities which it lacks, a very desirable fuel is the result.

Nearly every country in Europe to-day is seriously engaged in research work in connection with alcohol as a fuel for internal combustion engines. There is no question but that alcohol will play a very important part in the fuel of the future. The importance attached to alcohol as a fuel factor in England, France, Germany and Italy is so great that these countries are spending large sums of money to support investigations which the respective governments have called upon their best scientists and engineers to make. This work is relative to sources and processes for producing alcohol on a large scale.

Many investigators have been quick to realize the importance of alcohol as a fuel. As a result, there have been many attempts to produce satisfactory fuel mixtures containing alcohol as an important component, with the

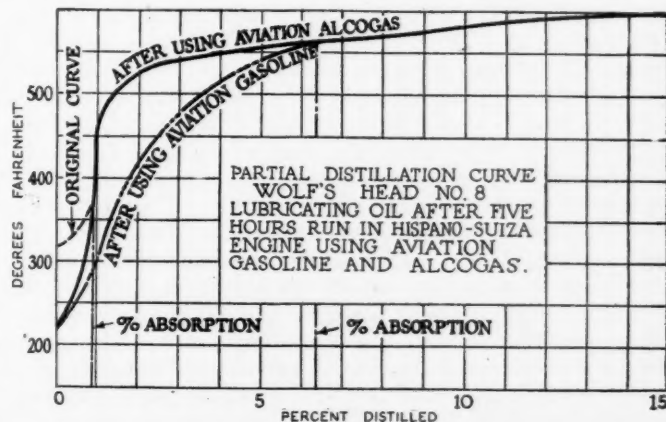


Fig. 2

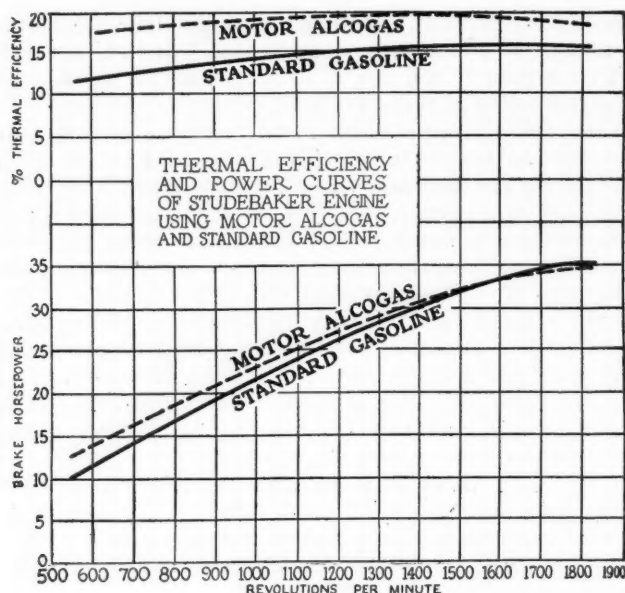


Fig. 3

hope of realizing the advantages accruing from it. In almost every case, however, these attempts have proven unsuccessful, due entirely to their impracticability or failure to meet all the present or future requirements, or both. One successful synthetically blended fuel, in which alcohol with all its advantages plays an important part is being produced in limited quantities under the trade name "Alcogas." This fuel combines among others, the advantages of petroleum distillates, coal tar distillates, and alcohol. For commercial reasons the exact formula is not given, but the components have been so chosen and proportioned that each renders the maximum assistance to the others in meeting the many fuel requirements for both present and future engine designs. The practicability and usefulness of this fuel is adequately supported by results of official tests conducted by the Bureau of Standards, the U. S. Navy, U. S. Air Mail Service, Columbia University and by the experience of many individual users of the fuel in trucks, passenger cars, marine engines, etc.

In Fig. 1 are shown the distillation curves of two grades of alcogas as compared with those for export gasoline and standard motor gasoline. It will be noted that the initial boiling point is approximately the same for all these fuels. The homogeneity of alcogas is clearly indicated by the distillation curves. In the case of the more volatile grade almost the entire volume is distilled over at the initial boiling point, while more than 50 per cent goes over at the same temperature in the case of the motor fuel. This factor is a very important one as regards crankcase contamination and oil consumption. Under actual flying tests conducted by the U. S. Air Mail Service with alcogas between New York and Washington, for a period of six months, the average oil consumption was about 40 per cent less than when using gasoline.

To determine the comparative percentage of fuel absorption by oil for alcogas and gasoline, a five-hour full power run was made with each, using a Hispano-Suiza engine, a partial distillation of the oil, before and after using being made. The results are shown in Fig. 2. The absorption in the case of alcogas was 0.9 per cent while in the case of gasoline it was 6.33 per cent. This is a very important consideration, especially as regards efficiency of lubrication and the life of engine parts and the engine as a whole.

Fig. 3 shows the fuel consumption, thermal efficiency

and b. hp. obtainable on a standard four-cylinder Studebaker engine, after setting the carburetor for an air-fuel ratio to give maximum thermal efficiency. The maximum horsepower for both alcogas and gasoline is approximately the same at maximum engine speed, but the power is slightly greater at all lower speeds when using alcogas.

Fig. 4 shows the fuel consumption in pints per b.hp.-hr. for alcogas as compared with gasoline for an air-fuel ratio giving the leanest possible mixture. The mean fuel consumption for this condition is 1.00 pt. per b.hp.-hr. for alcogas and 1.17 pt. for gasoline. This represents a saving of nearly 15 per cent.

The following table shows the limiting conditions of mixture for alcogas and gasoline.

Table of Air-Fuel Mixture Properties

	Gasoline	Alcogas
1. Richest mixture on which engines will operate over the speed range employed .....	9.7	9.15
2. Leanest mixture on which engines will operate over the speed range employed .....	14.9	16.0
3. Chemically correct ratio.....	14.7	12.3
4. Per cent of air chemically required present in 1.....	66	75
5. Per cent of air chemically required present in 2.....	102	130
6. Ratio for maximum power.....	13.2 to 11	12.5
7. Ratio for maximum efficiency.....	14.9	16
8. Per cent of air chemically required present in 6.....	90 to 75	102
9. Per cent of air chemically required present in 7.....	102	130

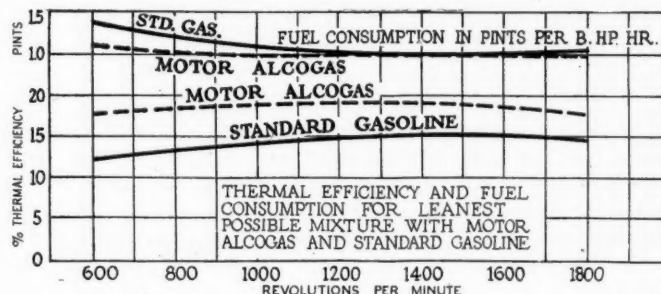


Fig. 4

From the above it will be noted that gasoline has practically no range on the lean side of the best mixture, while with alcogas the range is about equally divided, the total being over one and a half times as great as for gasoline.

From the above discussion it is evident that alcogas is an entirely practical fuel meeting the requirements of present day engines besides possessing many very important advantages. Probably its most important advantage is its applicability to the very high compression engines of the future.

In Fig. 5 are shown the results of tests made by the Bureau of Standards on a standard Liberty engine using alcogas at various altitudes up to 25,400 ft. The engine was equipped with special pistons to give a compression ratio of 7.2 to 1. The curves show the increase in power and economy resulting from this compression ratio as compared to a ratio of 5.6 to 1.

### Conclusions

Alcogas is only one of the many blended fuels proposed to aid in the solution of our motor fuel problem. No synthetic fuel will probably be the ultimate solution



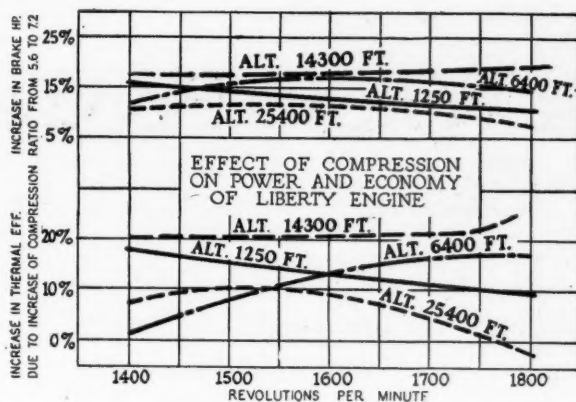


Fig. 5—Fuel used, Alcogas

of the problem, but they will all assist in postponing the day when we can no longer depend entirely upon petroleum resources.

In engine design, construction and use it is impossible to jump from the present day petroleum fuel to alcohol. Blended fuels can be efficiently and effectively utilized in present day engines and will meet existing requirements. Future developments will very probably take the direction of slower speed engines, higher compressions, longer stroke, etc., which are the qualities required for the efficient utilization of alcohol fuels.

In the near future it is hoped that this country will emphasize and encourage the production of alcohol for motor purposes as well as the use of blended fuels so that when the day approaches when our petroleum resources are exhausted, we shall have ample capacity for the production and utilization of fuel alcohol.

## Petroleum

THE production of petroleum involves a higher proportion of waste than is found in the mining of coal, with far more serious consequences because the domestic supply is altogether inadequate for meeting the present requirements of the country and the domestic resource is rapidly suffering depletion. Less than half of the oil underground is raised to the surface; there has long been an overproduction in respect to the higher types of uses, prompting the surplus to be used for crude purposes in the place of coal and water power. The responsibility for these conditions lies with the small-unit competitive type of mining prevalent in the United States, whereby the geologic unit or pool is arbitrarily divided into many small holdings separated by vertical boundary planes. Petroleum is a migratory mineral, moving underground in the direction of lower pressure, and hence each individual producer is forced to race with his neighbor for the extraction of the product. Thus not only is production in each new field quickly forced beyond the handling facilities of the moment, but much of the oil underground is permanently placed beyond recovery by this discordant type of production. There is a drift toward commercial integration and individual co-operation in petroleum mining, but with insufficient rapidity in view of the resource size.

The transportation of petroleum makes use of an extensive system of pipe lines, thousands of miles in length, spread over half of the country, connecting points of production with refineries, markets, and seaports. The efficiency attained in the transportation of petroleum energy is in marked contrast to that characteristic of coal energy and should point the way to the reconstruction of the latter, whose faults are now throttling the commodity transportation of the country as well as contributing to unhealthy urbanization and sectionalization.

The utilization of petroleum is far in advance of coal in that the bulk of crude petroleum now produced is separated into its chief components—gasoline, kerosene, fuel oil and lubricants—whereas coal is employed dominantly in the raw state. Here again the oil industry points to the analogous need for a coal refining industry to separate coal into mobile forms of energy and commodities. The utilization of the various petroleum products displays various degrees of efficiency, with the greatest discount applying to the low-use products such as fuel oil. The by-product actualities held in petroleum are not yet adequately utilized, nor are the by-product potentialities sufficiently developed. The most important immediate prob-

lem in connection with petroleum utilization is involved in the rapidly mounting demand for motor fuel, a circumstance requiring a rapid diversion of fuel oil from its present rôle of steam-raising fuel to that motor fuel—a change which may be brought about by a co-ordinated development of cracking methods of distillation and adaptations on the part of internal combustion engines to a lessened dependence upon volatility. The adequate growth of automotive transportation on land and sea and in the air would seem to be involved in the successful handling of this issue.—From a paper by C. G. Gilbert and Joseph E. Pogue presented before American Society of Mechanical Engineers.

### The Havre-Paris Pipe Line

FOR the purpose of delivering petroleum from Havre to Paris, a pipe line 126 miles long is being constructed for the Compagnie Française de Transport des Mazouts et Petroles. Except for one-tenth of the distance the line will follow the Route National from Havre to Paris. The pipe, which is to be 10 in. in diameter, is to be laid along the edge of the road 3 ft. below the surface. At Havre and Paris there will be ten tanks of a capacity of 55,000 barrels each, and six tanks of a similar capacity will be stationed along the route at the pumping stations. The latter will be provided with apparatus for heating heavy oil so that it may flow easily.

An interesting point in the plans for construction is that arrangements have been made to utilize trench-digging machines, which were sent to France for the American Army, and were taken over by the French Government when the latter acquired the American Army stores. The pipes, tanks and pumps required for the undertaking are being sent from America.

THE Society of Motor Manufacturers and Traders (Great Britain), has voted a sum of \$125,000 (nominal exchange) for the formation of a fund to be known as the "S. M. M. T. Trust Fund" which will be used for the purpose of granting relief to persons considered eligible as having contributed to the encouragement, promotion, or protection of the motor trade. In addition, the Society has voted a further sum of £5,000 to the Cycle and Motor Trades Benevolent Fund, bringing the total contribution of the Society to that Fund to nearly £14,000.

# Steel Spoked and Disk Wheels Popular on British Cars

Wire wheels still favored for high grade cars but wood wheel is almost extinct. Pressed steel spoked type used extensively on small medium priced cars. Several types of disk wheel employed. Corrugated disks are hard to clean and are being abandoned. Demountable rims uncommon.

By M. W. Bourdon

**O**N British cars the wood type of wheel is practically extinct, for only one or two makers will use this type in 1921. The wire spoked wheel is still favored for high-grade cars, the principal makers of this type being Rudge-Whitworth and Dunlop, both of whose designs are probably well known in the United States.

Unquestionably the most popular type of wheel for small, medium priced cars is the pressed-steel hollow-spoked variety, of which Sankey was the originator. The Sankey wheel consists essentially of two pressings, each forming half the rim, spokes and hub, these being welded together at the vertical center line. There is one other part, however, consisting of a unit which forms lateral webs in the spokes, which is inserted between the halves before they are welded together. The hub of the complete wheel is drilled for tubular distance pieces, through which pass the threaded studs holding the wheel to the hub in casting by means of exterior nuts, this being the favored method of fastening detachable wheels of this variety.

Some few failures of the Sankey wheel are said to have occurred through the tire pressure separating the two portions of the units forming the rim. This shortcoming is made a great deal of by a competitor who has entered the field against Sankey, namely Goodyear (no connection with the Goodyear Tire Co.). To overcome this drawback Goodyear welds a complete rim between two steel pressings resembling those of the Sankey.

Detachable flange rims are comparatively rare in England, though there is one well-known popular make, the Warland. This has a detachable flange secured by bolts, but this flange merely locates a transversely split rim with a loose segment which can be removed and the ends of the main portion drawn together for easy fitting or removal of clincher tires. Sankey has, however, recently introduced a detachable flange rim for a wheel of the pressed steel hollow spoked variety, the method of construction otherwise being identical with that of his original pattern.

A novel type of wheel construction is that introduced by Smith-Parfrey, originally wood wheel builders. It is

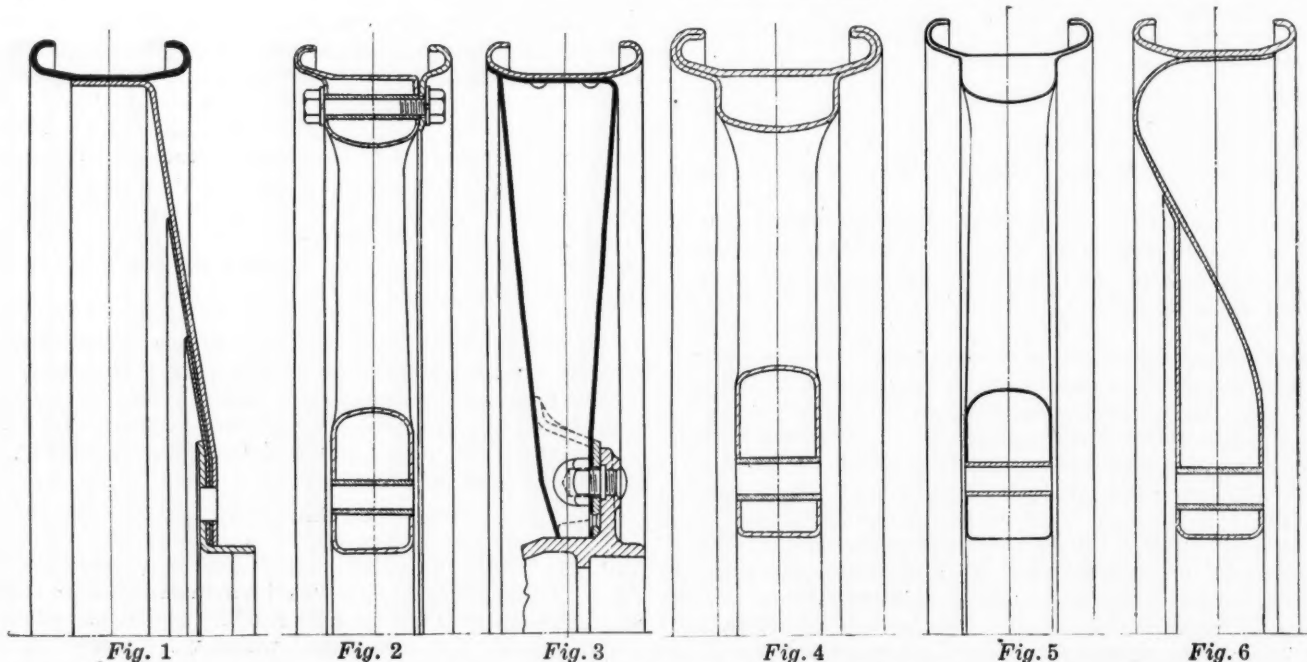
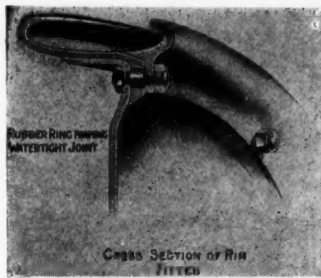
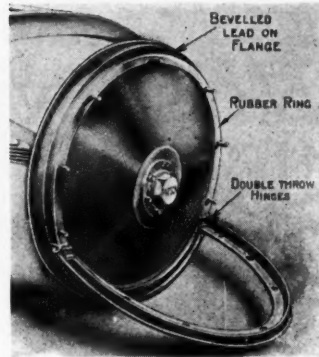


Fig. 1—The Riley laminated disk wheel. Fig. 2—The Sankey hollow spoked wheel with detachable clincher flange. Fig. 3—Section of the Goodyear corrugated disk wheel. Fig. 4—Section of the Sankey pressed steel hollow spoked wheel, which consists of two units welded at the center line. This is the original of its type. Fig. 5—The Goodyear pressed steel hollow spoked wheel, which has a separate and complete rim welded between the two units forming the felloe, spokes and nave. Fig. 6—Part section of the Sankey dual disk wheel. This is used by some makers with the flat surface outward, though the curved surface is normally intended to form the exterior





Section of Rapson  
hinged flange rim  
and disk wheel



Rapson hinged flange  
rim and disk wheel

built up, as shown in an accompanying sketch, of flat steel plates shaped at one end so that the combined units form the hub, the outer ends of the spokes being riveted and welded to a rim base of flat section. Strength for weight, there does not seem any advantage in this system, nor does it present any benefit in cleaning. It is put forward for both cars and trucks.

In regard to disk wheels, these are gradually becoming more popular with both makers and users, and not infrequently wire spoked wheels are enclosed by detachable aluminum disks. Two car manufacturers make their own disk wheels, namely Armstrong-Siddeley and Riley. The first named has attached to the rim by welding and riveting a disk with a very large hole in the center, the inner diameter of the disk in the case of rear wheels overlapping the brake drum and being secured to it by studs and nuts. In the case of front wheels the disk is bolted to inner disks secured to the hub.

Riley has a laminated disk built up of three disks increasing progressively in diameter. All are secured to the wheel hub, but only the larger one extends to the rim, where it is spot-welded. The laminations are also spot-welded together. The Riley design somewhat resembles the Michelin, except that the latter has a single disk tapering in section.

Sankey is making a disk wheel for quite a number of car manufacturers, but this is a dual disk, as shown in the section herewith, the main unit extending from hub to rim and being considerably dished toward the center. At the back of the main disk there is a second, flat-surfaced

disk, welded to the other, the two together forming a hub varying in width according to size of wheel as a whole.

The Goodyear wavy disk wheel, which first came into prominence when it was adopted for Angus Sanderson cars in 1919, has not found a great deal of favor, and, although it is being continued, the makers are shortly introducing a flat disk type. It has been found that the wavy disk, as might have been expected, is almost as difficult to clean as a spoked wheel, and while it fails to present any advantages in that respect, it certainly has none in appearance, the corrugations giving a distinctly clumsy effect, both when the wheel is stationary and when running.

Another make of disk wheel is the Lynton. This has a flat disk of uniform thickness offset from the rim center and is riveted and welded to the tire rim. Lynton has for many years past made a disk wheel consisting of two plates, between which the tire rim is clamped. The inner plate is fixed to the hub, the outer one being detachable, thus providing a demountable rim effect.

Dunlop has recently introduced a corrugated disk wheel, but it is considered doubtful whether this will obtain any popularity. Although it probably is considerably stiffer than a flat disk, the multitude of corrugations is a distinct disadvantage in the matter of cleaning. A separate hub plate, to which the corrugated disk is welded, is used.

Rapson has recently put forward a disk wheel with two-thirds the rim flange hinged to the remainder to facilitate tire manipulation. This is shown in perspective and in section in accompanying illustrations.

Although the vast majority of British wheel makers specialize entirely upon wheels and rims for clincher tires, the possibility of straight-side tires being popularized in the near future has not been overlooked, and Dunlop, for example, is making the new corrugated disk wheel for both clincher and straight-side tires. There has, however, been no indications of any great move toward straight-side tires by British car makers or users.

A point in favor of the disk wheel of the single disk type is that it allows the point of tire contact with the ground to be more easily brought under the axis of the steering pivot. Armstrong-Siddeley, Riley, and one or two other makers have taken advantage of this, fitting vertical pivots immediately over the point of tire contact. Users confirm the claim for peculiar ease of steering and freedom from shock, even when compared with steering lay-outs having inclined pivot pins with their prolonged axes extending to the tire contact centers.

## A New Type of Piston Ring

A PISTON ring of unusual construction has recently been designed and tested by Harry B. Johnston of Seattle. The ring is approximately triangular in section and but two rings are used per piston. The cylindrical face of the ring fits the bore of the cylinder. A second face at right angles to the axis of the piston is disposed toward the head of the piston in the case of the upper ring, and toward the skirt in case of the lower ring. The third face is inclined at an angle of 35 deg. and fits against a correspondingly inclined surface of the groove. The ring is given only a slight spring to hold it against the cylinder wall, but the pressure existing in the combustion chamber is admitted to the spaces between groove and ring, thus forcing the ring against the cylinder wall to maintain a gas-tight joint. The wedging action of the tapered face of the ring against the inclined face of the groove is said to increase the effectiveness of the seal. It is claimed for the ring that it effects an increase in power

development as compared to conventional rings and prevents oil pumping as well as leakage of fuel into the crankcase of the engine.

Piston ring depending  
chiefly on gas pressure  
to maintain seal



## Three Post-War Wolseley Chassis

Two are four-cylinder models of 10 and 15 hp. respectively, and the third is a 20 hp. six-cylinder model of earlier design but somewhat modified, and of quite different design from the fours. The "Fours" have overhead camshafts with blade-spring drive. Battery ignition is standard.

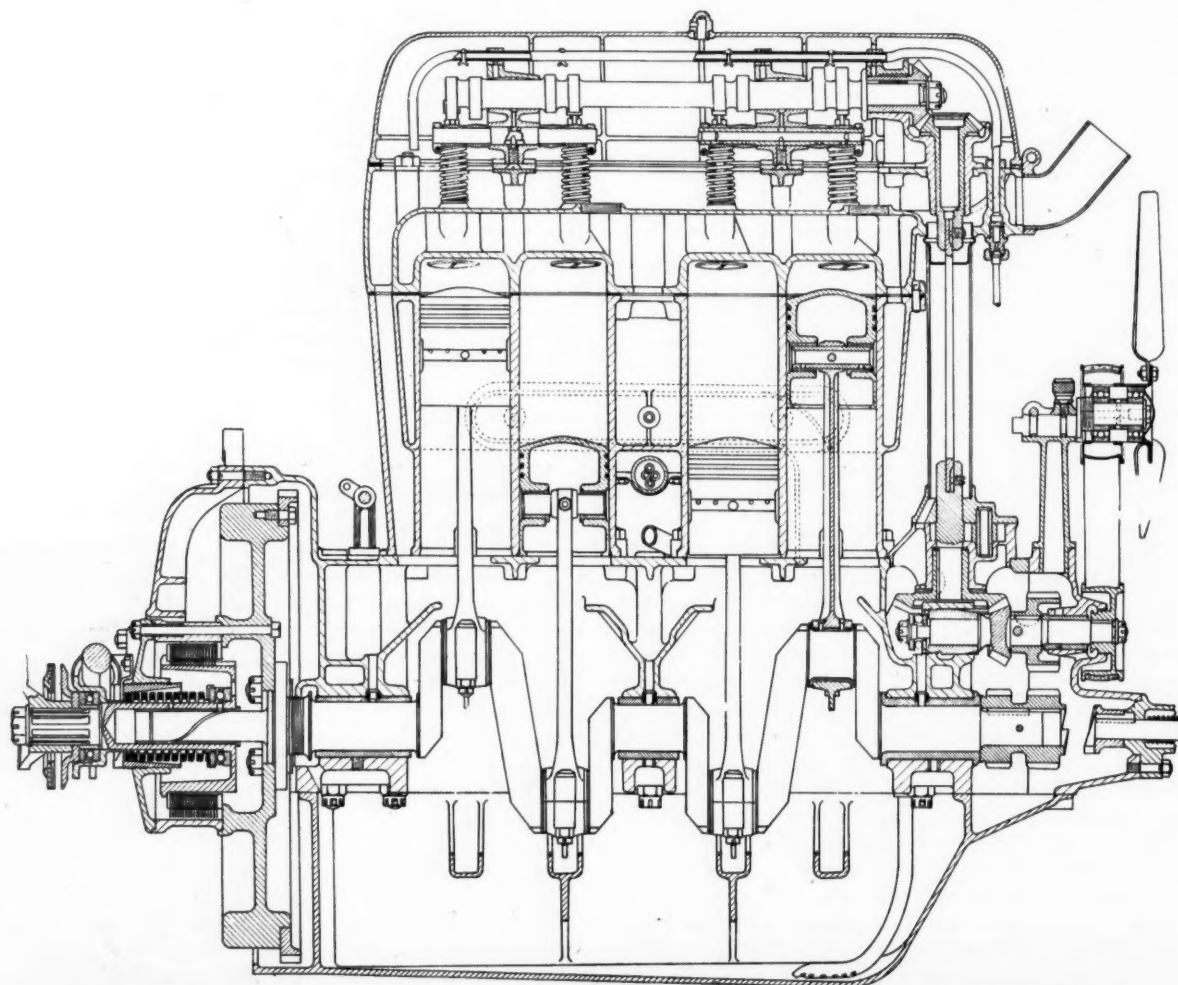
By M. W. Bourdon

**T**HE three units of the post-war Wolseley range were shown at last year's Olympia Show and created a large amount of interest, but production and other difficulties prevented deliveries being commenced until quite recently in respect of the two smaller types, though the six has not been so belated.

Chief interest attaches to the 15 hp. model, made for four passenger bodies. It departs in almost every detail from pre-war Wolseley practice, has a high efficiency overhead camshaft engine and the complete chassis form weighs only 1800 lb. The special features of the engine are embodied also in the smallest model, a light runabout with a four-cylinder engine having a bore and stroke of  $2\frac{9}{16} \times 3\frac{3}{4}$  in. and being one of the best finished and best sprung of its type on the road. Its selling price is now \$2,700 complete.

The 15 hp. chassis has, then, a four-cylinder  $80 \times 130$  m.m. ( $3\frac{1}{8} \times 5\frac{1}{8}$  in.) engine with a detachable head carrying the camshaft and valves. The cylinder block is of cast iron, and is bolted to the top part of the aluminum crankcase. The camshaft (like the crankshaft) is carried in three bearings and has the valve rockers pivoted on a shaft immediately below it, the cams applying to projections on the rockers situated midway in the length of the latter; the rockers are, in fact, of inverted T shape with the cams applying to their single member.

A somewhat involved form of drive is used for the camshaft. First there is a silent chain which runs on three sprockets, on crankshaft, water pump shaft and countershaft respectively. The countershaft carries a bevel pinion meshing with another pinion at the lower end of the vertical drive which latter carries just above the bottom



*Longitudinal section of Wolseley 15-hp. ( $3\frac{1}{8} \times 5\frac{1}{8}$  in.) engine, showing spring blade camshaft drive*

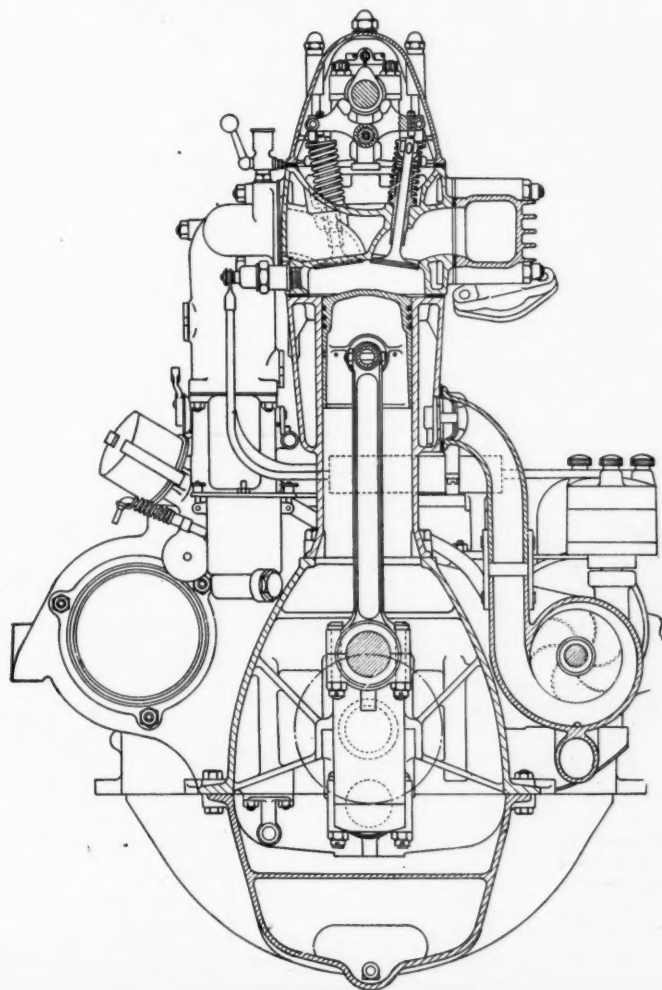


bevel pinion the primary gear wheel of the oil pump. At the upper end of the driveshaft another bevel gear meshes with one on the front end of the camshaft. A special feature is a spring blade coupling 7 in. in length between the separate upper and lower ends of the drive shaft, the object being to afford a certain amount of flexibility in the camshaft drive to induce silent valve operation.

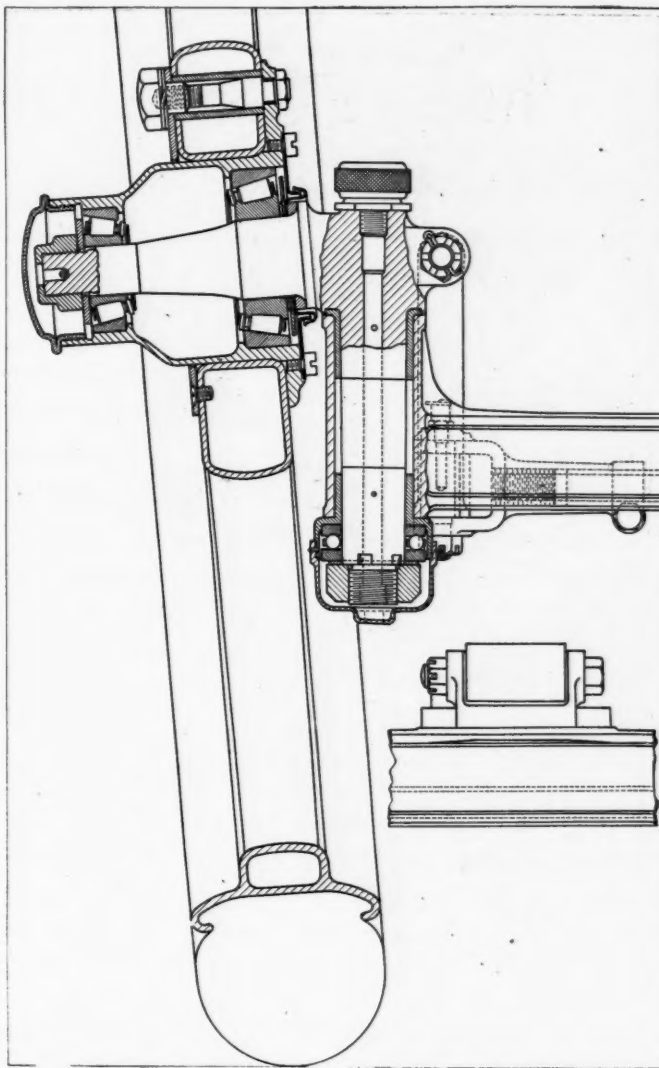
Dynamo-battery ignition is standard, but most of the chassis delivered hitherto have had magneto ignition. Whether magneto or dynamo be used (the latter as a unit with contact breaker and distributor), it is driven by a rearward extension of the water pump shaft on the left of the crankcase, the spark plugs being on the right and the cables passing across through a tunnel in the center of the cylinder block at the lower end of the barrels.

Lubrication is on the trough system for the connecting rod bearings and pistons, but large catch pits are formed over each main journal and oil is fed directly into these. The aluminum pistons have three rings with the hollow piston pins floating in bronze bushes in the bosses, the pins being fixed in the connecting rod small ends by  $\frac{1}{4}$  in. bolts passing right through. From the oil pump, a copper pipe leads to the camshaft bearings and from the latter oil runs through drilled holes in the brackets to the bearings of the hollow rocker shaft and to the rockers themselves. Surplus oil returns to the crankcase through an external pipe at the rear end of the head casting and through the tube enclosing the vertical driveshaft at the front. Provision is also made for a direct oil lead to the silent chain and to an indicator on the instrument board.

There are separate exhaust and inlet manifolds on the left and right respectively of the head casting, the car-



Transverse section of 15-hp. Wolseley engine



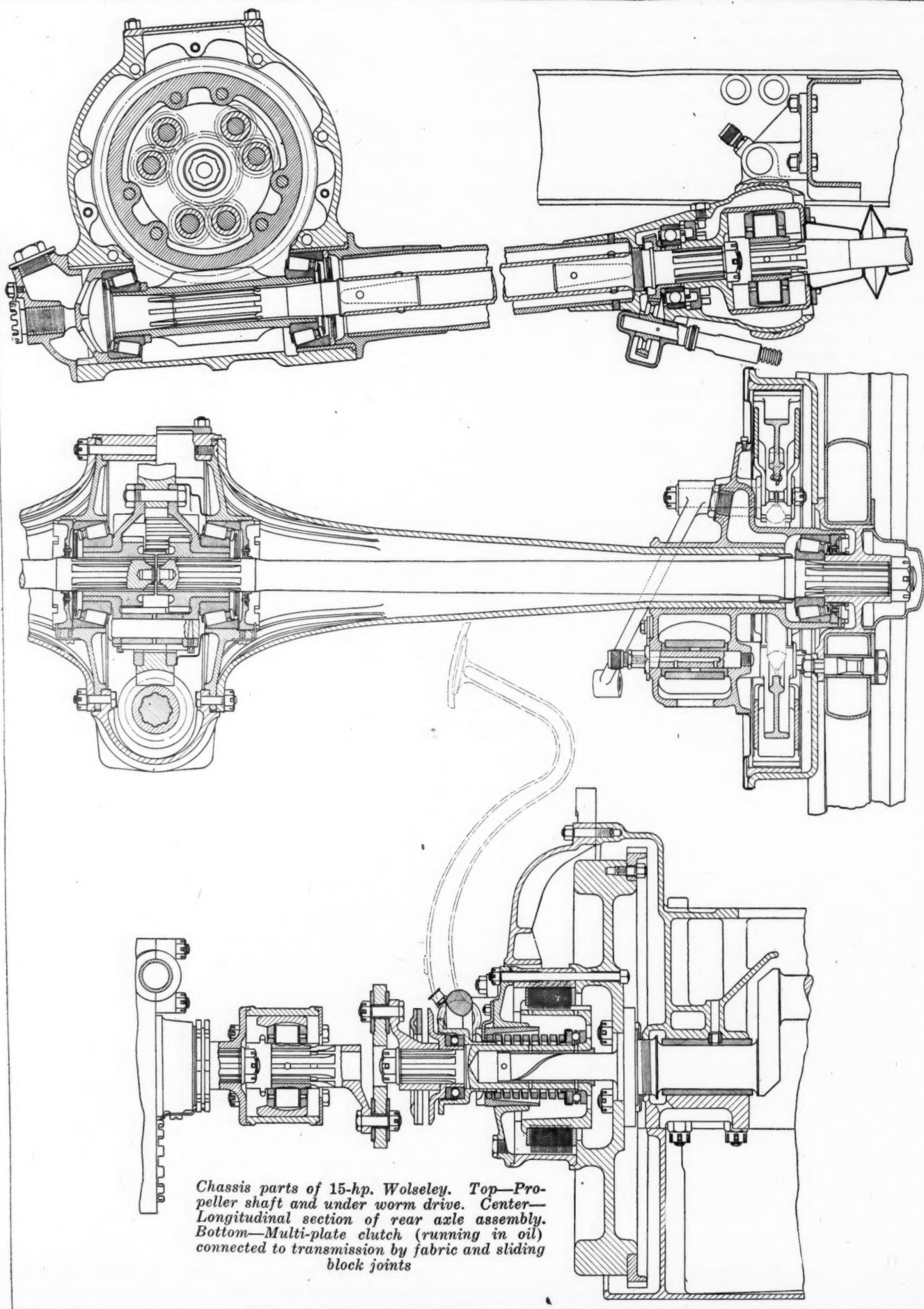
Wolseley front wheel and ball-thrust steering knuckle

bureter with vacuum feed being a Wolseley edition of the S. U. bellows pattern. A claim of a fuel consumption of 30 miles to the Imperial gallon is made.

The flywheel is completely enclosed, its casing supporting the starting motor alongside the right of the crankcase, which is carried by four arms extending to the main frame. A multiplate clutch running in oil is used, with a coupling shaft having sliding block and fabric disc joints. The three-speed gearset with right hand control is supported by tubular and pressed steel cross members, at one point from the former in front and at two points from the latter. Behind the gearset a short exposed coupling shaft with a fabric disk point at the front end leads to the enclosed sliding block type universal at the head of the propeller shaft, the latter being enclosed in a torque tube with a spherical mounting slung below the center of a pressed steel cross member.

Under-worm drive (4.8 to 1) is used in the rear axle, which latter has an aluminum center with tapered steel extensions. The axle is of the non-floating type with Timken roller bearings throughout, this type of bearing also being used in the gearset, except for the pilot, which has a plain bush. Front wheels also run on Timkens with a ball thrust for the steering pivots.

Both sets of brakes apply within the 14 in. wheel drums of pressed steel, the latter having steel rings shrunk into them to provide a wearing surface. In each brake drum there are four segments in the same plane, opposite pairs being actuated by hand lever and pedal, the shoes all being  $1\frac{3}{4}$  in. wide.





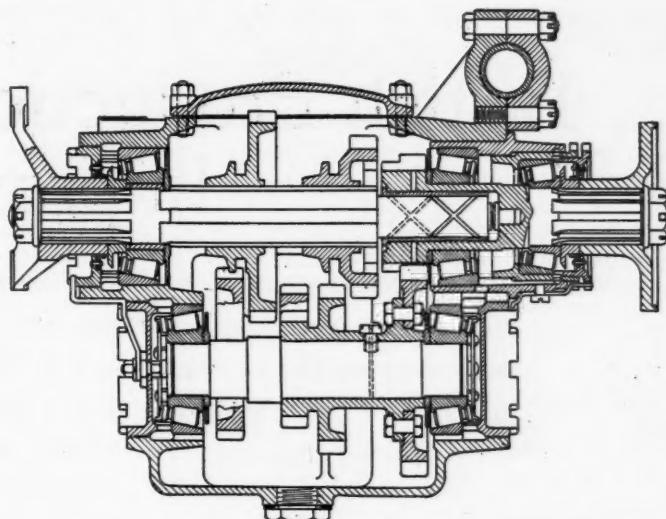
Another special feature (for a car of this size) is the use of quarter elliptic springs, these having been tried out on the 10 hp. model in pre-war times with great success.

The steering is of the worm and worm wheel type, the housing being mounted on the front arm of the crankcase on the right with a transverse drag link to the left hand swivel lever. Pressed steel hollow spoke wheels are standard with 815 x 105 mm. (32 x 4 in.) tires, the wheelbase being 118 in. and the track 52 in.

With its standard type four-passenger open body and the usual full equipment, the 15-hp. Wolseley sells at \$4500, and it is currently reported that a substantial increase may occur in the near future.

The principal point wherein the 10-hp. model differs from the 15-hp. is that it has its three-speed gearset as a unit with the worm driven rear axle. Originally it had a unit cast cylinder block and crankcase; but these are now separate, the latter in aluminum.

In almost every main detail the 20-hp. six-cylinder is different from the 15-hp. It has its cylinders cast in threes with integral L heads, magneto ignition, four-speed gearset, transmission brake, open propeller shaft, cantilever rear springs and wire wheels. Where it bears resemblance is in the trough system of lubrication, alu-



Three-speed gearset used on 15-hp. Wolseley

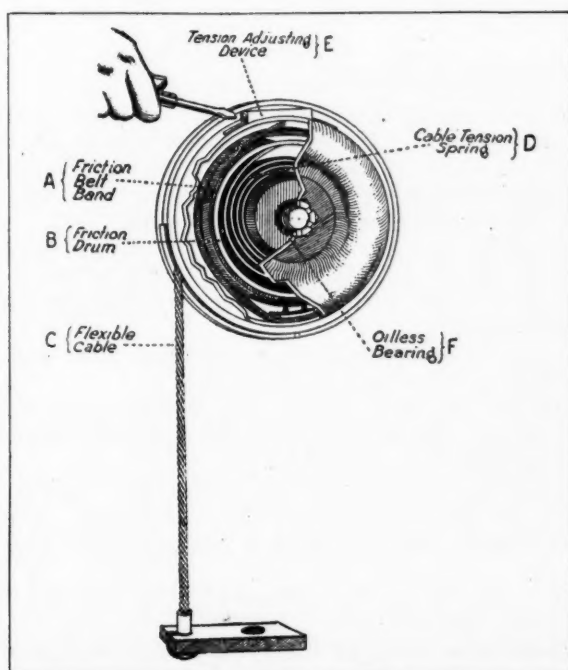
minum pistons, vacuum feed, multiplate clutch, amidships position of gearset, and worm drive. It weighs 2460 lb. (chassis only), has a wheelbase and track of 138 in. and 54 in. and sells at \$6300 with a five-passenger body.

## A Friction Band Shock Absorber

**A** SHOCK absorber acting only on the recoil of the spring is manufactured by the Gilman-Davis Mfg. Co. An adjustable friction belt band engages with a friction drum and any tendency of the body and the axle of the car to suddenly separate, causes a sufficient tightening of the friction belt band upon the drum to counteract the thrust and retard the upward movement. This result is accomplished by the frictional contact between the free end of the band and the drum and by the forward movement of the opposite end of the band by the rotation of the drum.

On the other hand, when body and axle approach each

other, the tension of the flexible cable is released and the spring is permitted to return the drum. Coincidentally the friction between the free end of the friction belt and the stationary drum, co-operating with the reverse movement of the opposite end of the band, loosens the band sufficiently to allow the drum to be returned by the spring. The tightening and the release of the friction belt band are automatic at the beginning of each forward or reverse movement of the drum. Adjustment of the band tension can be made with a screw driver.



The Gilman shock absorber

## Repairing the Ford

**T**HE Ford automobile is in such universal use and there are so many of them to be found that the business of repairing them assumes gigantic proportions. J. Howard Pile, in his recently issued book, "Modern Methods of Ford Repairing" (U. P. C. Book Co., New York), describes methods and tools which will facilitate the standard repairs. Competition is so keen and the margin of profit so small that the work must be done efficiently or the profits will turn to losses.

In the compilation of this service manual, the author has studied factory and shop methods from many angles, and the reader is given the benefit of observations covering many of the most profitable and efficient Ford service stations in the country. This material was first published in a serial in Motor World, but it has been revised and brought up to date and there is considerable material in the book that did not appear in serial, such as wiring diagrams of all the starting and lighting systems that were put on the Ford car before the FA starting and lighting system became standard equipment.

The size of the book is such that it can be carried in the pocket, the pages being 6½ x 4½. Beside the twenty-four wiring diagrams, there are 135 illustrations of special tools, equipment and devices and the pages run to 251, including a complete index of all operations and subjects.

# British Production Methods Show Improvement

Many British manufacturers have made a decided improvement in their production methods, but there are still a number of high-priced, low-value cars on the market. In the British automobile industry it is considered discreditable to use stock parts. It is the general opinion that every self-respecting manufacturer must make all component parts of his cars.

By M. W. Bourdon

**T**HERE are still a number of British firms who have not departed appreciably from their pre-war designs, and among these may be mentioned Sunbeam, Vauxhall, Arrol Johnston, Daimler, Rolls Royce, and Star. But such firms have not, up to the present, experienced any difficulty on that account, for they have sold all the cars they could make on the excellence of their reputations, and at any price, within reason, they have cared to demand.

But with increasing competition from makers who have thoroughly up-to-date designs which, in many cases, such as Austin, Crossley, Angus Saunderson and especially the new 18-hp. Phoenix, which is an excellent production job, have resulted or will result in reduced costs of production, the hands of the more conservative manufacturers will probably be more or less forced in the not far distant future. As supply continues to gain on demand the prospect of the pre-war standards of design being more generally superseded becomes nearer at hand, for there is plenty of scope for closer co-operation between designer and production engineer.

No surprise will be felt if before this time next year there is introduced the true post-war models of certain of the firms which are still making merely a modified pre-war car. The home market will before long approach the present saturation point so far as some of the comparatively high priced (or low value) cars are concerned, and if their makers are to keep their heads above water they will have to produce designs more adaptable to economical production. In his tours through some plants the writer has been astounded at the lack of evident endeavor to simplify design from the production standpoint.

The policy frankly adopted by one maker, if not actually advocated by him, of "letting buyers do the testing" of new models is not general; nor is it singular—unfortunately for both maker and user. Unfortunately for the latter for two reasons, one of which is obvious but the other not so clear. This policy may enable production of new types to commence earlier than would be the case if the experimental chassis were put through prolonged tests, but it cannot surely be so economical in the end; it has, in some cases, to the writer's personal knowledge, involved serious alterations to or replacements of patterns, jigs and special tools, and these must clearly be paid for by someone—if not by the maker, then by buyers.

Wolseley, Armstrong, Siddeley and a few others who introduced post-war chassis at the 1919 Show have been objects of contumely in some quarters for not having commenced deliveries until so many months later. But there has been "method in their madness" which should be

to their subsequent advantage, even though they have lost immediate benefit.

Doubtless many who rushed deliveries of post-war chassis not thoroughly tried out were encouraged to do so by the need for revenue to keep plants going and by the clamoring of the public for new cars last year and until the end of the past summer. The former has indeed been a spur in some instances, but one that has been ineffective nevertheless, and as a result financial difficulties are being experienced in some quarters, while rumors of troubles to come are by no means infrequent and not always ill-founded.

Some if not a large proportion of the new firms who rushed into the automobile industry for the first time last year are currently reported to be *in extremis*, and although in certain instances the trouble has arisen from difficulty in obtaining material, from the molders' strike and from labor difficulties in general, in others it has developed from faulty design, bad organization and a lack of experience.

There is, therefore, in prospect a "weeding-out" of unstable concerns, not necessarily brought about by a "slump," but by mismanagement, unjustified optimism, lack of capital at the outset, or any combination of the three.

## Multiplication of Models

It is to be noticed that a few British firms have changed their pre-war policy of endeavoring to cater for many markets with several models of different sizes. But the plan of specializing on one type has by no means received general approval as the following will show:

Daimler has three models, two with identical engines and gearsets but differing appreciably at various points of the chassis; the third with a larger engine and a heavier type altogether.

Star has two models issuing from one plant and two more from an allied and adjacent factory.

Humbers have three models, and though two are identical in engine and gearset they differ almost everywhere else; the third is entirely different.

Vauxhall has two models with different engines and chassis, but not entirely dissimilar, one being a "general purpose" model and the other a high efficiency sporting type.

Vulcan has three, two somewhat alike and the third bearing no resemblance.

Wolseley has three, all different, though two have the same system of overhead valve operation on engines of entirely different dimensions.



In addition, Daimler, Star and Vulcan produce truck chassis, the first and last one model each with detail variations, and Star three models.

### Divergencies in Detail

As briefly indicated, in many cases where more than one model is produced there is very little opportunity—nor is there much endeavor—to make either main or subsidiary units adaptable to the different chassis. We find chassis with both unit power plants and separate gearsets issuing from the same maker; subframes and no subframes; cone and disk clutches; right-hand and central gear controls; vacuum and gravity fuel feed systems; magneto and battery ignitions; L head and overhead valves; open and enclosed propeller shafts; and so on indefinitely. It seems as though some firms cannot make up their minds as to which alternative in each case is the better, and though it is apparent that one system of construction in a particular part may not be suitable for two entirely different chassis types, that is not always, by any means, accountable for the divergent practice.

It will be accountable to most people, for example, why Daimlers fit a honeycomb radiator with the filler inside the bonnet on one model and a tubular radiator with a normally positioned filler on another model, both having identical engines; why they use two ball-bearing star universals on the propeller shaft of one of these cars, and a block and star at front and back respectively on the other. It cannot be said that one model is an earlier type than the other and therefore does not embody the latest approved practice. This is doubtless the reason in a few instances, but it does not hold good in the majority; it would certainly seem that there is only too frequently no endeavor to cheapen production by utilizing identical parts where possible for two or more models.

### High Standard of Performance

But despite all the foregoing, British cars and British production methods are improving, there can be no question of that. Whether they are improving as fast as they might is another matter. The established British maker is, at least, far-seeing in one respect, if not generally; he is not attempting to turn out cars that he has reason to believe will do him no credit. He may adopt designs bad from a production standpoint and he may get down to production in his limited way (judged by American standards) without giving his new models a six or twelve months' testing; but, with a very few exceptions, he will not allow immediate gain by shoddy work to jeopardize his reputation. Nor will he "design down to a price" without consideration for his future interests.

In most branches of engineering the British manufacturer is inclined to be conservative, but it is only fair to

give him credit for turning out "good goods" when he does adopt a new design or accessory. So the British automobile engineer usually sets himself a fairly high standard in engine efficiency, workmanship and finish. Most of his customers buy cars to keep and use for many years. Eighty per cent, too, take pride in the appearance of their cars, externally and under the hood, and therefore expect a finish which will do them credit. They like individuality to a certain extent, and therein the British maker gives them perhaps more than they need, generally designing and making every main unit to his own ideas.

### Attitude Toward Stock Components

There is no pronounced expansion of the components side of the industry. One or two quite small concerns who have yet to make a name for themselves have commenced to supplement Wrigley in supplying gearsets, axles and steering outfits. But they do not count for very much, and, speaking broadly, the car manufacturer makes every component himself.

Admittedly Dormans and Tylors have turned out a lot of engines during the past eighteen months, but Vulcan, Ruston Hornsby (Dorman) and Angus Sanderson (Tylor) are the chief users of their engines. Both do far more business in truck engines, making, between them, for W & G, A.E.C. and Hallford among others, who, usually, do not advertise the fact that they are fitting engines of other than their own make.

In fact, the frame of mind among concerns and individuals in the British automobile industry is that it is discreditable to use stock components. There is no discredit attaching to Humber, for example, in getting some engines made to their own design by Peter Brotherhood (the general engineering firm whose own tractor did so well at Lincoln); but if they made use of a stock engine they would feel they had reason to be ashamed—they would look upon it as implying that they were not qualified, had not enough brains and experience, to design and make their own.

So with clutches, gearsets and back axles. The general opinion is that no self-respecting manufacturer would do other than use these as designed and produced in his own

No wonder, then, that British cars are highly priced when the foregoing is considered alongside the comparatively small outputs. The writer could mention offhand a score of firms, whose names would convey nothing in the United States, who are turning out small and medium powered cars at the rate varying from only 100 to 500 per annum and who make every component. It is the same in all branches of the industry—private cars, trucks, motorcycles, marine outfits and tractors—all makes have their individual components, apart from accessories such as carbureters, magnetos, etc.

## New High-Speed Cutting Tool Alloy

A DEMONSTRATION was recently made at Sheffield, England, of the cutting powers of a new alloy produced by the Cooper Research Co.'s laboratory, Cleveland, Ohio, and known as cooperite. The basis of the material is nickel, and there are added tungsten, silicon, molybdenum, aluminum and zirconium—the latter up to 15 per cent. These ingredients are melted in a crucible furnace, cast into tools, and ground, no heat treatment being required. The material has a fine silky fracture, and, it is claimed, is free from shrinkage and blow-holes. Tools made from it have been tried by the Sheffield Testing Company, with very in-

teresting results. For the tests the tools used were  $\frac{3}{4}$  in. square, depth of cut 3-16 in., traverse per revolution 1-16 in., cutting speed 123 ft. per minute, and the weight of material removed from the test bar 4.85 lb. per minute. One tool ran for 9 min. 6 sec., and another for 14 min. 39 sec., the report in the latter instance being that at that time the tool was "slightly worn, but still cutting," while a tool of high speed steel was said to have been "done up" after 2 $\frac{3}{4}$  min. The British rights have been secured by London interests and the alloy will shortly be marketed in England.

# Cutting Costs in the Manufacture of Small Units

A detailed study of the parts to be manufactured often reveals opportunities for cutting cost before unknown. This article contains a description of special tools and methods used by a carburetor company in manufacturing the small units which go to make up its product.

By J. Edward Schipper

**I**N the manufacture of carburetors and other small units, there are many opportunities for cutting costs which are not apparent except when a very close and detailed study is made of the parts to be manufactured. For maximum efficiency, the operator must never wait for the machine. This principle is true from the standpoint of the manufacturer, as well as from that of the operator himself, who is thus afforded every opportunity to make the most out of his premium or piece-work arrangements.

Another consideration which comes up very frequently in the manufacture of small parts, is whether to use hexagonal or round stock. It is oftentimes possible to save money on the stock by using round in place of hexagonal, even where hexagon heads have to be milled on the piece. The time necessary for the "hexing" operation, however, must be taken into consideration.

In the plant of the Zenith Carburetor Co. there are two or three notable examples of marked advances in efficiency by the installation of machines which handle relatively small parts. Fig. 1 illustrates a machine for cutting hexagon heads on round stock. This machine saves the Zenith Carburetor Co. 12 cents per ft. on material alone. The hexagonal stock would weigh 2.89 lb., as compared with 2.54 for the round. The price difference is 2 cents per lb., even on the same sizes, but considering the smaller weight it is possible to use with the round material, the money saved on stock is 12 cents per ft.

Furthermore, with hexagonal stock it is necessary that the nut or hexagon be the largest part of the piece. There are times when this proves inconvenient, from an assembling and accessibility standpoint, as is the case on the Zenith carburetor, where the parts are close together. The pieces manufactured on this machine have a hexagon  $\frac{5}{8}$  in. across the flat and of  $\frac{1}{4}$  in. depth. The machine is a duplex type, cutting on one side while loading on the other, and turns out 20 of these per minute. It operates so quickly that the number turned out per minute is entirely dependent on the skill of the operator in loading and unloading; he cannot quite keep up with the machine.

## Efficient Machine Work

As will be seen from Figs. 1 and 2, there are two independent drives, one for the cutter spindle and the other for the feed, and for rotating the work holding spindle. The cutter is 5 in. in diameter with fifty ordinary straight teeth. It is made of high speed steel and has turned out 150,000 pieces without being reground. The machine has a cam feed operated by a drive independent of the cutter drive. It is started by the operator pulling a lever, and the cam feed is so arranged that a quick motion of the swinging arm carries the work up to the feed; then

the cam moving the swinging arm goes out of operation and allows the work to follow the contour of the master cam, which is identical with the shape to be cut on the piece. That is, the master cam may be hexagonal or square, or any other shape. This master cam rotates with the work when it is moved over by the swinging arm cam, and comes in contact with a hardened block on the machine which acts as the cam guide, the cam traveling according to its contour on this hardened block, thus moving the swinging arm to and fro.

## Table Operating Cam

After the work has made two revolutions, the table carrying cam comes into operation again and moves the work away from the cutter so that the operator can remove it. The table has a quick motion away from the work, due to the shape of the table-operating cam. This is a one-revolution cam swinging the table quickly to the work, releasing it for the master cam to take up the action, then picking it up again after the cutter has done its work, and restoring it to its normal position. The table with its master cam is held against the hardened block by a spring, the action of which prevents bouncing and chattering. The spindle holding the master cam at one end and the piece at the other is geared 2 to 1 off the table camshaft.

This machine, which has been patented by the Zenith Carburetor Co., has a cutting speed of 800 ft. per min. on brass and 100 ft. per min. on steel. It operates at high speed taking a very light chip, this having been found to give the best result with the brass composition used for carburetor parts.

Another machine used by the Zenith company for manufacturing small brass parts, is used for slotting the throttle shaft. This machine cuts a slot  $1\frac{1}{4}$  in. in length by  $\frac{1}{8}$  in. wide in a  $\frac{5}{16}$ -in. shaft. In order to give a layout which is sufficiently fast for the operator, a bank of machines is used with a chair placed on a track in front of the bank of five machines. The operator is thus able to slide rapidly up an down the row of machines and keep all of them in operation. A good operator can keep eight of these machines busy under normal conditions.

With this bank of five machines it is possible to slot four shafts per minute. The advantage of this machine over stock machines for the purpose is that the work is brought rapidly into position by the machine itself, instead of being screwed into position by a hand-operated, cross feed before the automatic speed of the machine comes into operation. By means of a cam the table is brought quickly up to the cutter and then the slow feed starts. When the cut is completed the table is backed rapidly away and the



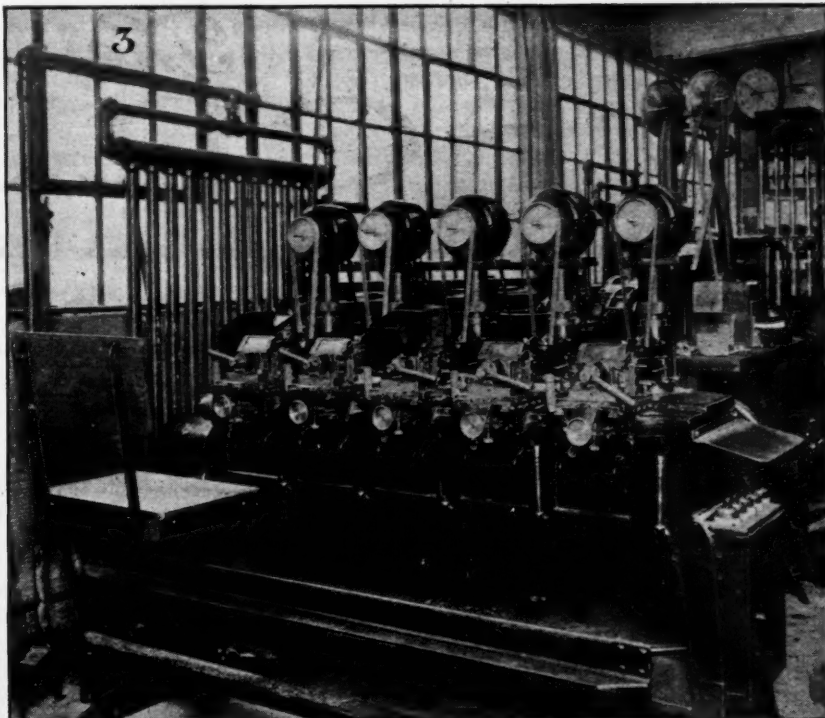
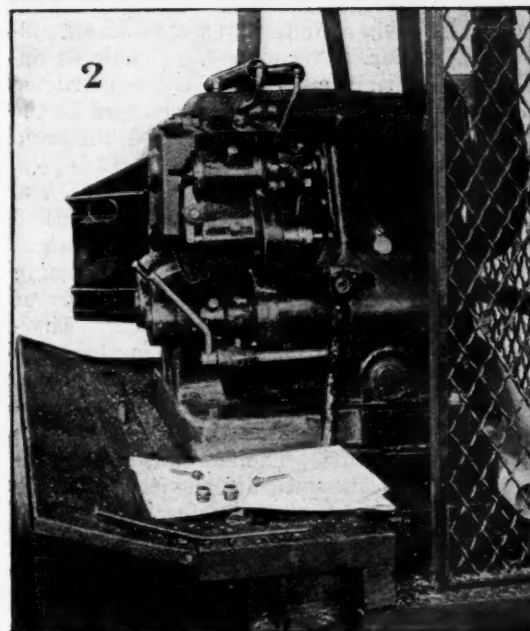
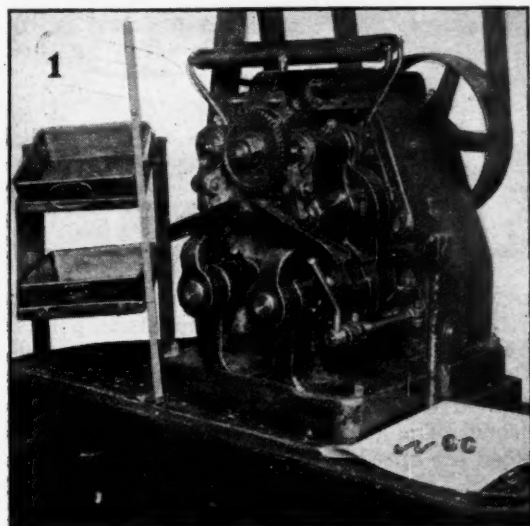


Fig. 1—Special machine for cutting hex or square heads. Machine is capable of turning out 20 pieces per minute, cutting on one side while loading on the other. Two sample pieces, one with a hex head and the other with a square head, are shown adjacent to the machine. The guard plate in front of the cutter is removed. Fig. 2—Another view of the machine for cutting hex and square heads. Note the spring on top of the machine for keeping the swinging arm cam in contact with the hardened block on the machine, as described in the text. Fig. 3—Bank of five machines specially designed for cutting slots in Zenith carburetor shaft. Fig. 4—Machines replaced by special machine for cutting slots in Zenith carburetor throttle shaft. These machines must be brought into position by hand rotation. On the improved machines the automatic arrangement quickly brings the table into position, after which the slow feed comes into control.

mechanism stops, permitting removal of the finished piece and the insertion of a blank. It is then restarted by the operator. A very ingenious feature on this machine is a safety cap which comes down over the cutter, as the work is being backed away, so that while this is revolving continuously, there is no danger of cutting the operator's hand while placing the work in position.

The spindles are driven by independent electric motors at 10,000 r.p.m. The feed camshaft is driven by a single motor, which is located at the side of the machine and drives the one-revolution cam which brings the tables up to their work, gives the necessary slow feed for this operation and then, when the cut is complete, rapidly backs the work off and stops the machine until it is restarted by the operator.

The object aimed at in these machines and which is being pursued throughout the factory, is to have the

machine do every bit of the work of which it is at all possible to relieve the operator. The stock machines replaced by the second machine described are shown in Fig. 4. The rotary hand feed necessary to bring the table up to the work before the automatic feed picks it up, is illustrated. This, of course, has the disadvantage of being slower, more irksome for the operator, far less fool-proof and much more apt to cause breakage of tools. These are highly specialized machines, of course, and their specific features would not be adapted for other installations. They serve to relieve the operator of muscular and mental strain, for his own benefit and for that of the firm. He is not required to concentrate to the same degree, with the result that mistakes are less likely to occur. Furthermore, the work is done more rapidly and, consequently, production is greater than with the general type of stock tools.



# The FORUM



## The Proper Method of Measuring Starting Torque of Engines

Editor AUTOMOTIVE INDUSTRIES:

It is now common practice for automotive engineers to use the winter cranking torque of an engine as the determining factor in selecting a suitable starting motor, as it is well known that the winter conditions are the most severe to be met. In addition, the battery performance is much lower in winter than in summer, and this in turn lowers the performance of the motor. While engineers agree on the above, I find that there is a diversity of opinion as to the nature of cranking torque performance of an engine at low temperature and as to the proper method of measuring same.

It frequently happens, when an engine is very cold, that it is very hard to break the moving parts loose. This fact, along with tests where an oscillographic curve is taken of the starting motor current, will at first lead one to believe that the most severe condition is the break away, and that, consequently, the locked torque of the starting motor is the important characteristic to be considered.

It is my opinion that when the above break away condition exists, it is due to the presence of moisture in the crankcase, same having frozen at the low temperature, or in some cases where different kinds of metals are used in bearing caps, crankcase, etc., the bearings contract so as to actually seize the shaft.

Tests in which the writer has participated would indicate that at low temperature the cranking torque of an engine is proportional to the cranking speed, and the lower the temperature the greater will be the relative increase in torque with speed. Such being the case, it becomes apparent that it is not so much the locked torque as the speed-torque characteristic of the starting motor which is important, for if the motor will crank the engine at the required speed at say 10 deg. Fahr., then there is little chance that it will not meet the break away and summer cranking conditions. The summer cranking speed must, however, be sufficiently high to prevent what has been

termed hunting, i.e., prevent the Bendix pinion flying in and out of mesh when going over the compression points.

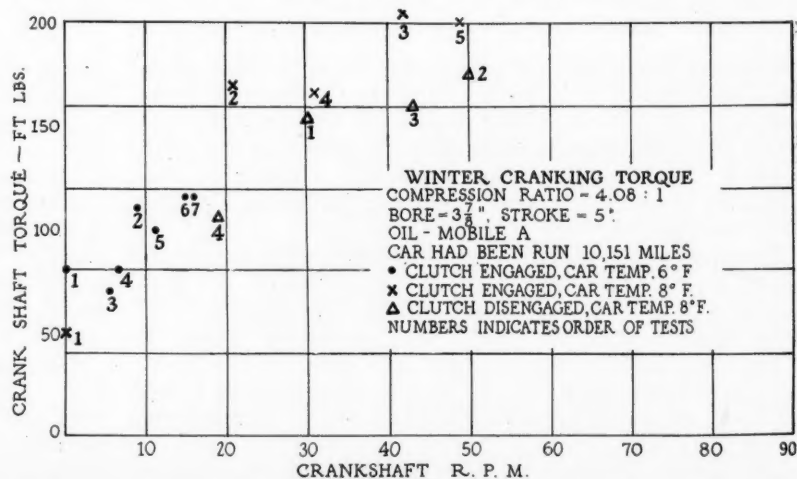
The proper way to measure starting torque is to gradually increase the applied torque until the crank starts to move. The applied torque at this point is equal to the break away torque. The applied torque should then be increased and after the speed becomes constant, the torque and speed observed. Make observation at several different speeds, and from the data obtained a curve may be plotted.

The two enclosed curves represent the winter cranking torque performance of a six-cylinder 207 cu. in. and a six-cylinder 354 cu. in. engine. The tests were made at approximately 10 deg. Fahr. in a large ice box constructed for experimental purposes. Mobile A oil was used in the engines, both of which had been run several thousand miles prior to these tests.

The cooling water was drained from the engines, and they were then run into the ice box, which had been cooled to near zero temperature. The cars were left in over night and the temperature was regulated so that in the morning we had approximately 10 deg. Fahr. The temperature of the battery electrolyte observed as that of the car. Thermometers were also placed in a bottle of oil in the same room.

To measure the torque, we had a calibrated starting motor with back gearing, the back geared shaft connecting to the front end of the crankshaft. The starting motor current was supplied by two six-volt batteries connected so we could throw from two to six cells in series, and in addition we had a rheostat and ammeter shunt in the line so that the current could be regulated and its value observed.

We would first gradually raise the current until the engine shaft would just barely turn over, and the observed current was taken for calculating the break away torque. The line resistance was then decreased and the switch closed. When the speed became constant the current was observed, and so on, until we had the current draw for several different speeds. From the calibration curves we then interpolated current draw to torque for each speed and plotted curves such as those herewith. Later on in the winter we checked the cranking speed of the small car



Cranking torque of automobile engines when cold



after leaving it outdoors over night, and found that the results checked closely with those obtained in the ice box.

All of these tests proved to us that within the range of winter cranking speeds the running torque was greater than the break away torque.

As to the general law that the friction of rest is greater than the friction of motion, I believe that conditions here do not warrant its application. This law I believe applies to friction between solids, whereas we are concerned with the shearing friction of congealed oil. I believe, if you will imagine yourself wading in a tank of congealed oil or similar substance you will have a fairly close idea of the condition in a cold engine, for it seems easy to conceive of the required effort increasing rapidly the faster you try to move.

In making tests of winter starting torque the inertia effect should be eliminated and also any other external influences which might affect the results.

The oscillographic curve method of measuring the starting torque I consider misleading, especially when full battery voltage is applied and the observed starting motor current recorded as the engine comes up to speed. In the first place, this method does not eliminate the inertia effect, which is a big factor, and in the second place the natural starting characteristics of the motor, even without load, would result in a high starting current which diminishes as the speed increases. Take the well-known equation of an electric motor:

$$E = IR + E_c,$$

where  $E$  is the applied voltage;  $E_c$ , the counter E.M.F. of the motor (which is a function of the speed) and  $IR$  the resistance drop in the motor. In starting,  $E_c$  is zero;

therefore  $E = IR$  and  $I = \frac{R}{E}$

Starting motors have a resistance of 0.006 to 0.008 ohm. Therefore, the current  $I$  at starting must be large and the falling off as the speed increases is an electrical characteristic entirely independent of the torque characteristic of the load. Of course, the exact shape of the oscillographic curve would be affected by the load. However, as the speed increases,  $E_c$  increases and  $IR$  must drop.  $R$  being constant, the drop is all in the current.

The principles advanced in this article are based on the assumption that the liquids in the crankcase or cooling system are not frozen solid, which should be the case at 10 deg. if the car is properly taken care of. P. J. KENT.

## The Over-Geared Fourth

Editor AUTOMOTIVE INDUSTRIES:

In your editorial on Page 1035 in the Nov. 18 issue on the Question of Over-geared Fourth Speeds, you make some statements to which we would like to take exception.

You intimate that the primary object in using an over-geared fourth speed is to get maximum car speed. Our object in the design and use of a four speed transmission with an over-geared fourth was not primarily to obtain high car speeds, but was to obtain better economy at touring speeds without sacrificing good low speed performance in traffic on direct drive, and also to use a lower engine speed for touring.

We agree with your statement that "from a fuel economy standpoint it is always advantageous to use the highest gear possible, provided it does not pull the engine down to a speed where it runs unsteady and begins to knock." Fuel tests have shown that the gasoline consumption per b.h.p. hour increases very rapidly from the one-half load throttle position to the nearly closed throttle position for any given speed. Therefore, if an engine were so geared to the rear wheels that it required nearly half of full engine power at a given speed to propel the car,

very good economy would be obtained. It is easier to do this at the higher car speeds generally used for touring, say from 30 to 45 m.p.h., than at speeds used for city driving, since there is less need for quick acceleration at the higher speeds and therefore the engine can be used nearer to its maximum capacity.

In selecting the total reduction between engine and rear wheels, two conditions should be considered, city driving and country touring. One ratio cannot fill these two conditions as well as two when both economy and performance are considered.

A great deal can be said on the subject of gear ratio and its relation to car weight, performance and economy, and it would take several pages to go into this fully. All of these factors must be studied in relation to each other and with the engine characteristics, in order to make the best selection of gear ratio to meet the desired conditions. The fuel consumption curves of engines generally show that the best economy at both  $\frac{1}{2}$  and  $\frac{1}{4}$  full load lies within a small range of the engine r.p.m. If the engine is so geared that this range is used for city driving on direct drive, good economy can be obtained, and then by gearing up for touring so as to use approximately the same range of engine speeds for the higher car speeds, good economy can also be obtained for touring. This selection is always a matter of compromise and depends on which feature is preferable, rapid acceleration and hill climbing ability or economy.

For the one who does both city driving and touring, economy is important under each of these conditions and can best be obtained by using a different gear ratio for each condition. The most economical ratio for touring would be altogether too high for city driving and since it is preferable to do city driving on direct, the ratio for touring would be an overgear. The increased noise is not so objectionable at the higher speeds. Therefore, the over-geared fourth is not a feature of luxury, but one of economy, on the car which is used for both city and country driving.

HERBERT C. SNOW, Engineer,  
The Winton Company.

## Spare Parts on Export Cars

Editor AUTOMOTIVE INDUSTRIES:

I was much interested in Mr. Jennings's article of the 6th re selling spare parts with export cars.

Naturally, foreign business men do not like to be required to do anything, but, one would suppose that if they were really reliable, they would wish to take up the service end of the business. In any case, I cannot imagine any company with a real desire to build up a lasting export business shipping cars without spare parts any more than they would omit the electrical equipment.

It seems to me that it would be a good plan to include a certain number of the most essential spare parts as part of the equipment with the initial shipment; the cost to be included in the price of the cars. The dealer would not then feel that he had been compelled to do anything, and, after realizing the utility of the spares sent, would in all probability hasten to order a complete stock.

This plan need only be followed where the dealer omits to pay attention to this important matter.

Cobble Hill, B. C., Canada.

MILWARD V. HARRIS.

THE British Board of Trade has issued a license under Section 20 of the Companies (Consolidation) Act of 1908 to the British Motor Cycle and Cycle Car Research Association, which has been approved by the Department of Scientific and Industrial Research as complying with the conditions laid down in the Government scheme for the encouragement of industrial research.

# The Importance of the Labor Problem Has Not Diminished

The present industrial situation affords manufacturers an exceptional opportunity to put their house in order. When working forces are built up again, effective methods will insure an efficient working force. This article reviews three new books which discuss this phase of production.

**T**HE labor situation at present involves more potent though less obvious dangers than it did six months ago. There are more reasons for labor to be discontented and a more favorable opportunity for the spread of unsound radical doctrines. The fact that labor is not in a position to give voice to that discontent as loudly as at this time last year has given to some the false impression that the whole problem has been solved. As a matter of fact, its growth and complexity has really become greater with the unemployment and social questionings which inevitably accompany it.

The advantageous position which employers occupy in relation to labor, however, provides them with an exceptionally good opportunity to study thoroughly those problems relating to the human element and to apply them effectively.

If employers during the next six months can give a thoroughly square deal to their employees, even though not forced to do so by economic pressure, they may confidently expect better co-operation from labor when business conditions return to normal and labor is again in greater demand. If the favorable opportunity is used for the application of repressive measures, however, a continuation of the fight by labor when it gets in the saddle may be just as confidently expected.

Because the present time is especially favorable to the study and development of effective personnel methods, particular interest attaches to books which bring together the standards of practice in such work insofar as such standards have been developed. Much theory has been written on this subject, some of it well worth reading, but descriptions of practical methods and standards have to a large extent been confined to short articles and specific instances.

Three books have recently been published by the Ronald Press Co. which embody much practical information of value to the man actually engaged in personnel work. The one entitled "Employment Methods," by Nathan W. Shefferman, is worthy of note as being almost the first book on this subject to offer exact and detailed practical help to the employment manager. In contrast to "Personnel Administration," by Tead and Metcalf, reviewed recently in AUTOMOTIVE INDUSTRIES, Shefferman's volume will appeal more to the man actually involved in the operation of employment work than to the theoretical student of industrial affairs. It was said of the Tead and Metcalf book, "If this excellent discussion of principles could be supplemented by a more practical book concerning the actual methods and forms to be used in installing and operating personnel work, the literature on this subject would be much more complete than it now is. The latter phase

has not yet been satisfactorily treated. "Employment Methods" is best described briefly by the statement that it does treat all of the practical phases of employment work in a detailed manner.

A part of this book will be elementary for the man familiar with employment work, but its inclusion renders the volume a complete guide for the novice desiring aid in establishing employment work for the first time.

A carefully devised set of forms for use in connection with every phase of employment work is presented and thoroughly explained in the two chapters, "Employment Forms." Unnecessary red tape has been cut out and only essential forms have been included. Sufficient routine is included, however, to enable the employment manager to learn from his records all the details necessary to an intelligent administration of his department.

A few of the forms used in connection with job analysis will appeal to some as being theoretically excellent but somewhat complicated for practical use. The text matter relating to job analysis, however, is very good.

A helpful chapter is that in identification systems. Several complete systems are described and illustrated, each adapted to a different type and size of factory.

A chapter is devoted to a discussion of proper advertising methods as a means for securing workers. It is worth the attention of every employment manager or other executive who ever has occasion to insert want ads in the newspapers or trade journals. Many want ads fail to bring the best returns because they are not prepared in the right way; the wrong key-word is used, too many words are jammed into a small space, the text is not clear, etc. A detailed analysis and description of what constitutes effective "help wanted advertising," together with the best methods of utilizing it, are contained in this section.

Part IV of this volume is devoted to employment methods for the office, and comprises a detailed examination of the systems used by certain concerns which have developed their office employment departments to a high degree.

Being as it is a book of practical methods, "Employment Methods" does not lend itself to review by extensive quotations. It nevertheless very definitely fills a long felt want.

Another book which will be of value to the personnel executive interested in giving particular attention to industrial relationships at this time is "Labor Maintenance," by Daniel Bloomfield. This book does to a large extent for employees' service work what the Shefferman book does for employment methods. Since the matter of employees' service is in itself less practical, however, the book which describes it must necessarily fall below the other volume in this respect. "Labor Maintenance" is of interest chiefly as being a complete summary of all the things which have



been done along this line by various well-known firms throughout the country.

The author recognizes that definite standards for such work are altogether lacking, and he has made little attempt to set up such standards, except in the case of a few fundamentals.

This book will give to the personnel manager a large number of ideas as to activities that might be conducted along this line, and it will give him as well, in many instances, detailed instructions for carrying out these activities.

The chapters on Americanization are exceptionally sane, as for that matter is the treatment of that subject in Shefferman's book. "The best and most lasting achievements in Americanization work," Bloomfield says, "have resulted from indirect rather than direct influences. If the spirit and surroundings of the plant definitely suggest Americanism, a large part of the work has been accomplished. . . . Every executive, every foreman and every employee must be impressed with the matter of maintaining American standards with regard to the immediate surroundings of the shop, mine or mill."

Some of the author's conclusions in regard to housing and community effort on the part of the employer are open to dispute, but contain material well worth discussion. Folk festival and pageants of nations, for instance, may be very effective if rightly conducted, but they may also cause the expenditure of a great deal of money without any adequate return accruing to the organization. This is certainly true in one of the cases cited by the author.

"Labor Maintenance" constitutes the best summary of employee's service efforts thus far published and lays an excellent groundwork for the establishment of more definite standards of practice.

Although it touches very directly upon the labor situation, "Training Industrial Workers," by Roy Willmarth Kelly, makes a somewhat different appeal than do the other two volumes included in this review. While Dr. Kelly's book contains some practical material of use in establishing training work, its chief merit lies in the social background and the social potentialities for industrial training which the author develops in a most interesting and thorough manner.

In his preface appears an excellent summary of the

lines along which progress should move in regard to industrial training: "It is essential that private manufacturing establishments should avail themselves of every possible opportunity to secure the assistance of public and private educational institutions. It is essential on the other hand that educators should constantly modify their theories and methods in the light of the needs of progressive industrial concerns."

The development and growth of apprenticeship and modern industrial training is discussed, together with the function and possibilities of the various public and private agencies interested in the training of industrial workers. Executive and foreman training is also treated briefly, as is vocational guidance and the part which the manufacturer may play in it.

The treatment of the educational value of democratic participation in management is an excellent contribution to contemporary thought on this subject. A few pertinent ideas expressed by Dr. Kelly are embodied in the following quotations:

"Because of the general tendencies of the time in state and national government, it is only natural that co-operative management plans should multiply among industrial establishments. The demand for a modification of the old democratic control of the shop was by no means created by the war.

"Every thoughtful worker is able to detect evidences of inefficiency on the part of his superiors, and because he knows little or nothing of the real difficulties involved in executive control, he is . . . frequently bitter in his denunciation of the policies of the firm. . . . One of the chief weaknesses of many large concerns is the inability or unwillingness of the leaders to tap the immense reservoir of knowledge and ability possessed by the rank and file of the organization."

While these three books were written separately, one fact impresses the reader after studying the three. Each author emphasizes, in his own way, the necessity for a thorough analysis of all the factors which go to make up the problem of human relationships before a successful application of any methods can be expected. It is this study, analysis, and experiment which has been emphasized constantly by Mr. Tipper as a primary requisite to the successful solution of the problem of our industrial relations difficulties.

## Formulating Formulæ

DO you remember when you studied physics in high school; when facts came on you thick and fast, and when it sometimes seemed impossible to logically reason out the various steps by which the different formulæ were obtained? Did you ever give up in despair, just before examination time, and simply memorize all the formulæ you could lay your hands on? Then go into the examination and solve the problems presented by trying first one formula and then another in the hope that you might by chance find the one that would fit?

Later experience has taught, of course, that such methods can never lead to an intelligent or valuable knowledge of the subject. But somehow or other the formula idea remains with many people long after their high school days. A formula is so convenient. You just substitute certain values, multiply or divide, and there you have it. But in most problems of life values are quite vari-

able and formulæ frequently incorrect in their solutions.

Probably no phase of management has been hindered and misdirected by the formula evil more than that of human relationships in industry. It is so much easier to try one ready made formula after another, than to carefully study and analyze the complicated factors involved in the problem.

Playing upon this too common weakness, many clever men are making a living writing and selling formulæ. A new one appears every day. Read this one that came to a prominent manufacturer recently:

"Enclosed is a folder entitled 'The Power of Knowledge,' that briefly points the way for you to obtain a *complete personal mastery* over *every* labor problem in your organization." The italics are the editor's.

Presto! The labor problem is solved. "Ain't it a grand and glo-o-rious feeling?"

# Analyzing Present Increase in Individual Labor Efficiency

The visible usefulness of the work being done by any man has a direct bearing upon his productive capacity. Wages alone are not sufficient to urge the fullest use of abilities. If necessity obliges, you will shovel sand all day, but your chief desire will be to escape that kind of work.

By Harry Tipper

A GOOD deal has been said lately regarding the increasing efficiency of the worker, now that the shortage of labor has past and he is beginning to be troubled with the old economic fear of being out of work. This fact has been referred to as an evidence that the labor trouble has past, and is a cause of much satisfaction in many quarters.

As far as it alleviates the difficult situation in which we find ourselves in respect of labor, it is a very satisfactory change, but it should really induce us to analyze the causes of these fluctuations in the efficiency, and find out why it is that the incentive to efficiency is dependent upon the production situation from the standpoint of employment.

We know from experience with many classes of employees, that unless there is some other incentive than the wage, we have not induced the employee to put forward his maximum capacity and we cannot hope to secure a high proportion of that capacity in every-day work unless the wage incentive is supplemented by other points of value in this respect. While the increase in the efficiency of labor in the last few months is a considerable improvement over the previous situation, therefore, it is an illustration of the weakness of our present methods of industrial organization; particularly as it points out the lack of control we have over the production effort of the worker, and the interest which he will have in his work.

Two or three years ago when these articles were started, the statement was made that there is no incentive in human beings merely to work. There is an incentive to useful accomplishment, and it is this incentive which induces the man to labor.

In the days when prisoners in a jail were not given any work, one of the wardens in a Middle Western State conceived the idea that it was demoralizing to have all these prisoners spending their time in brooding and in getting up plots. He felt that there ought to be some occupation for them. He had no means of putting them to a regular occupation, but there was a pile of stones in one end of the prison yard and he set the prisoners to work moving that pile to the other end of the yard and then taking it back again. In the course of a week two men had gone insane, several of the other men were very fractious, and a goodly number were sick.

The diagnosis of the medical men who were called in was mental disturbance due to the irritation of the useless work. It was not, of course, stated in this everyday language, but that was the gist of their diagnosis.

The absolute uselessness of this work was visible to

the prisoners. They could not escape it and instead of being an advantage, it became a torture.

No human being will stay on useless work, and the incentive to work is in proportion to the visible usefulness of the work which they are doing.

If I am obliged by economic conditions in my individual case to shovel sand all day, I can do it, and I will make shift to get through with it. But the principal desire on my part will be to escape from that kind of work at the earliest opportunity, and I will probably reach my maximum capacity only as the fear of starvation obliges me to work harder.

The work which the individual worker has to do in industry varies very materially in the degree of visible usefulness. A large part of it is monotonous and repetitive in its mechanical requirements and very narrow in mental requirements. It is not particularly interesting in itself, because there is no visible growth of usefulness while the work is in the hands of the operator. For that reason the principal desire is to escape from the work, to work as few hours as possible and to do no more work than is necessary to maintain their position.

This is not true of all the work in industry by any means, particularly in the metal trades field, there are many jobs where the individual skill of the worker, his judgment, and so forth, enter into the work to such a degree that there is a visible growth in the usefulness and the creative impulse is satisfied by the conditions themselves.

Where observations have been taken in such classes of work, it is to be noted that there is a steady production effort and the relation between the amount of effort and the necessity for hanging on to the job is not so definite. There has been a definite improvement in this respect, in those plants where a concerted effort has been made not only to provide a fair treatment for the workers, but to educate them as to the place of their work in the useful production completed by the plan.

A friend of mine some years ago was general manager of a plant, manufacturing building supplies, particularly copper work and all kinds of special moldings. The plant was being run on the old basis, that as long as you paid the worker a proper wage no other attention was necessary. There was a good deal of dissatisfaction from time to time and a lack of any real esprit-de-corps.

This friend of mine was going over some photographs of the work as it had been installed in one of the important buildings in the State. He thought the men in



the factory might be interested. As he studied the matter his thoughts grew until he finally constructed a bulletin board, in itself an example of the finest work in the plant and the most careful artistic treatment. On this board he showed photographs of the various installations of the work with the names of the men who had been concerned in its manufacture. The pictures created so much interest that the plan was followed out regularly and it was finally extended so that on each job a blue print or a drawing of the completed structure for which the work was required, was put up in each department.

The change in the situation inside of six months was quite remarkable. The usefulness and value of the work which they were doing was impressed upon the workers by this means. They saw the reason for the accuracy which was demanded and the care which they were expected to take in their operations. A sort of renewed spirit of craftsmanship got into the plant and the effect upon the character and value of the output was distinctly noticeable.

Furthermore, difficulties were more easily overcome, and the men proved sufficiently interested in their work so that they were willing to double their efforts in an emergency.

Showing the worker the part which he plays in developing the useful product and the relation which

his work bears to the value and the service of that product, is a method of improving industrial relations which has great possibilities.

If the whole value of the potential capacity of the man is to be secured and kept working on his job, the intelligence and sentiment must be captured just as much as the economic interest must be satisfied.

A great deal can be done in capturing the intelligence and the sentiment by this means of education upon the work itself. It is not an easy matter to develop this so that it will be suggestive, agreeable and of value to the organization. It requires a keen knowledge of the workers themselves, a careful understanding of the factory methods and production, and an ability to present the information in such a way that it will not be recognized as education, but simply as general information about their work.

Incentive to useful accomplishment leads to the development of the best capacity of the man, where the usefulness of the accomplishment becomes visible to him. It will be worth considerable time and effort and money to make the usefulness of each industrial job visible to the worker, so that he is provided with a pride in his work, and what it means, with an understanding of the reasons for its accuracy and quality and with a knowledge of the value of speed in its completion.

## Tractors in Louisiana

THERE are to-day 5,622 tractors in operation on Louisiana farms. This State, it is said, leads the South in power farming, and no other State of the South, save only Texas, approaching Louisiana in the number of tractors in use. The Louisiana allotment of one popular-priced tractor for the coming year is 4,000, while another manufacturer has placed the allotment of his machines to the same territory at 1,500, so that there should be, before next November, at least 12,000 tractors at work in the Pelican State. In all probability this number will be exceeded by at least 1,000, but the 12,000 is a safe estimate. This means one tractor for every four and one-half farms in the State, there being 54,000 farms in Louisiana.

The rice farmers are the most advanced of all the tractor users. Up to some seven years ago, only a few farmers in Louisiana—and those mainly the large plantation owners—had tractors. The majority of these tractors were in the rice "pocket" as this section of the State is called, while there were few in the sugar "bowl," and virtually none in the cotton "belt."

To-day every successful rice-producer has at least one tractor; many have two, and some are operating three or more. For them, the tractor cultivates the ground, puts embankments around the field to hold in the water, pumps off the water at the right time, cuts the rice when it is ripe, threshes it, sacks it, and, not infrequently, hauls it to market. The only thing the tractor has not been able to do in the rice industry is to stick the plants in the mud. This has to be done by hand.

The larger rice-planters find it advisable to run both large and small tractors, the former for deep-land breaking and operation of threshing machines, and the latter to harrow, to pull the cutters and binders, and tie the grain in bundles for the threshers. Farm power for preparing and cultivating the land and for harvesting and threshing the grain is second only to irrigation in the rice industry, and often is the limiting factor in rice production.

The sugar planters use the tractor not to prepare the

land, but to cultivate the growing crop, yet it was some time before the tractor was developed to the point where it could care for the growing cane of various ages as well as cultivate and seed the ground and harvest the full-grown crop. By working with two types of tractor, one for breaking the ground and seeding and harvesting, and the other, a higher machine, for straddling the rows and cultivating the growing cane, the sugar men gradually came into general use of the tractor.

In the sugar district, the most commonly used tractors are the Cletrac, Moline, Universal, Fordson, Rumely and E-B. The rice men are partial to the Advance, Rumely, Case, Avery, Waterloo Boy, E-B, Twin City, I. H. C., Samson, Fordson, Huber, Russell and Wallace.

The application of the tractor to the cotton industry never has gained the momentum it has in the sugar and rice sections, largely because the cotton planters, working on higher, dryer and more easily cultivable ground, have not had occasion to seek machinery to do their work to the extent the rice and sugar men have had to seek it. Far-sighted cotton planters, however, are devoting more and more attention to the tractor, and one of the greatest and most fertile fields for tractor sales lies in the "cotton belt" of Louisiana and Mississippi.

A COMMITTEE of the American Society of Mechanical Engineers recently collected a list of all the organizations in this country which are giving active attention to the problem of labor education. This list indicates that great interest is being taken in this question. Among the prominent agencies applying themselves to this work are: National Metal Trades Association, National Industrial Conference Board, National Association of Corporation Training, National Association of Manufacturers, National Society for Vocational Education, Federal Board for Vocational Education, American Academy of Political and Social Science, American Association for Advancement of Agricultural Teaching, American Technical Association of Pulp and Paper Industries, and several U. S. government departments.



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## Wood Conservation—a Necessity

FEW persons who have not given the matter some study appreciate the extent and importance of the wood-using industries or the necessity of conservation in the raw and finished material upon which they are dependent. The value of the products of the primary and secondary wood-using industries is said to aggregate over ten billion dollars annually, and these industries employ more men than any other single industry in this country. Under these circumstances it is of course a necessity that conservation of forest products be practiced and encouraged by every possible means. A great work in this direction has been done by the Forest Products Laboratory which is a branch of the Forest Service of the U. S. Department of Agriculture. It is conservatively estimated that the commercial application of research work carried on by the laboratory is already saving the country \$30,000,000 annually.

The automotive industry is a large user of wood and has profited in no small measure as a result of the work of the laboratory. It could profit to a much

greater extent if the value of the work done was more widely appreciated. Information concerning economy and more effective use of lumber (with consequent safety in shipments), economical operation of kilns, preservation and finishing of wood, and much other information of great value along similar lines has resulted from the activities of the laboratory and is being distributed by it to the great good of all users of wood and articles in the construction or packing of which wood or its products are employed.

The Forest Products Laboratory is largely dependent upon Congressional appropriations for its support, and is seeking an appropriation of \$400,000 for the coming year. It should have at least this amount and members of Congress should be made to appreciate the value of the work done and the need of further research, both from the standpoint of the industries directly benefited and the public which is certain to benefit in a still larger degree. We urge that our readers look into the matter for their own good and then see that their Congressional representatives are duly informed of their views. Particulars can be had from the laboratory itself as well as from the Association of Wood Using Industries, Monadnock Bldg., Chicago.

## The Engineer as a Citizen

IN the past two or three years much has been written about the desirability of the engineer taking greater interest in civic matters and some engineering organizations have discussed the matter in open meeting without the response that we feel the subject merits. Although city, State and Federal Governments have much to do with applied engineering and government itself can and should be in large measure reduced to a true engineering basis, but few engineers have become prominent in public life and the type of engineer attracted by civic activities has not always been of the best. There are conspicuous exceptions to the rule which simply proves that the engineer who bestirs himself and applies his training in a logical way can with credit take his place in civil affairs, as well as men trained in other professions. Herbert Hoover is one who has done this, and another is James Hartness, Governor-elect of Vermont, an S. A. E. member and a manufacturer whose product is widely used in the automotive industry. Mr. Hartness is a past president of the American Society of Mechanical Engineers, and has recently served as a member of the National Screw Thread Commission on which the S. A. E. and A. S. M. E. are represented.

There is no reason why other engineers should not serve the community in public office, but those who do so will be few if engineers in general do not take a more active interest in civic affairs. Is it not true that the average engineer is so much bound up in his own—frequently very narrow—specialty that he loses perspective and fails to function as a good citizen should?

Suppose the 5000 members of the S. A. E. joined with the many thousands of engineers of other societies and made it a point to take an active interest



in civic matters. The effect of such joint activity would be nation-wide, and the engineer would soon take the place he deserves in the estimation of the public.

During the war the S. A. E. made a splendid name for itself through the whole-hearted co-operation extended to Government engineering activities. Work of similar nature is still being carried on, but neither the S. A. E. nor other engineering societies are taking the active interest in broader governmental matters which the needs of the hour or the importance of the engineering profession demand. Individual effort is commendable, but united effort alone will suffice to give the engineer the standing before the community which will be accorded if he will assert himself and insist upon the systematic application of engineering fundamentals in the conduct of Government affairs.

## Fitting Traction Devices to Cast Disk Wheels

**D**URING the winter, when the road surface is covered with snow and slush, solid tired vehicles require anti-slipping devices applied to their wheels to enable them to get sufficient traction. These traction devices are different from the usual non-skid chains used on pneumatic tired passenger cars in wet weather. Usually they consist of a few lengths of heavy chain which are placed around the tire and wheel rim, and equally spaced around the circumference. In order to prevent the traction chain from slipping on the wheel, its ends must be securely fastened to the inside of the tire felloe or to the spokes. A great deal of difficulty is encountered in this connection owing to variations in design of the wheels. With spoked wheels the problem admits of a ready solution, as fastening hooks can be clamped around the outer ends of the spokes. Lately, however, steel disk wheels have come into extensive use, and in these no provision seems to be made for fastening the non-skid chains. Chains are absolutely essential if the truck is to be kept in service all the year round in this latitude, and the wheel manufacturers certainly could save users a great deal of trouble if they fitted chain attachment hooks to the wheel webs, or at least drilled holes through the wheel webs (according to some standardized plan) for fastening the hooks.

The way to widen the field for the motor truck is to make its use more convenient and less expensive to the owner, and the provision of non-skid hooks on cast disk wheels, while seemingly a minor matter, is a step in that direction.

## Is a False Pretense Worth While?

**N**O man is perfect, of course. Naturally, it follows that human plans are unlikely to be perfect, but that is no excuse for misstatements or pretense even in publicity ventures.

These thoughts are prompted by two form letters

which reached this publication a few days ago. Both contained the same hand-written corrections, evidently intended to fool the reader into believing the letter was not duplicated. In each letter the bidder for publicity said, "I made the selection of papers, chiefly the business papers I read myself."

But one of the two letters was addressed to a paper that has been out of existence two years or more! That spoiled the effect of the carefully laid plan. The pretense wasn't worth while, in fact it reacted against the person it was intended to benefit. This is true of pretense, whether practiced in form letter writing or elsewhere. It applies with special force to advertising, and that form of free advertising known as publicity is no exception to the rule.

## Transmission Efficiencies

**I**N a paper recently presented to the American Society of Mechanical Engineers some results of transmission tests are given which are hard to understand. For instance, it is shown that the direct drive of a four-speed transmission is less efficient than any of the lower gears, and this is ascribed to higher gear speed and consequent increased oil churning when driving on direct.

Now, with constant engine or motor speed, as substantially maintained in these tests, and with a transmission of the conventional design in which the constant mesh set of gears is located at the driven end, all the gears on the secondary shaft run at the same speed whether the truck is being driven on "direct" or on any of the lower gears. Also, it is these gears which should have the greatest effect on the power losses due to oil churning, as they usually run submerged in oil, whereas the gears on the primary shaft are above the oil level. About the only explanation for the unusual results obtained that occurs to us is that the transmission was of a type—sometimes used in the earlier years—in which the constant mesh gears are located at the rear end. But if such an unusual type of gear was used we should think it would have been pointed out in the paper. This gear was given up for the very reason that when on direct drive—that is, most of the time, the secondary shaft with its gears is running at about twice engine speed, whereas in the usual type of transmission it runs at only about one-half engine speed under these conditions. That the direct drive is less efficient than the lower gears is not only contrary to the general belief, but contrary to most previous experimental evidence.

**O**N advertising page No. 142 there is employed a very different sort of copy from that which usually appears in AUTOMOTIVE INDUSTRIES. It is an appeal for all Americans to assist in the rehabilitation of Europe by saving 3,000,000 children from starvation. This advertisement is donated by AUTOMOTIVE INDUSTRIES to this cause. You will find in the last paragraph directions for sending the money and the names listed are your guarantee that the money will be well used.

# Automobile Sales at Retail Spotty

## Dependent Chiefly on Local Business

Trade Improving in Half of  
Chief Distribution Centers  
—Poor in Farm Districts

NEW YORK, Jan. 3.—Retail automobile sales conditions in the leading distribution centers of the country are distinctly spotty. They are dependent upon the local industrial conditions. Where the general trend of trade is upward, sales are improving, but in sections where the slump has not reached bottom the automobile business is at a standstill. In general it can be said that the cities which were the first to feel the full effects of depression and have reached an adjustment, are the first to show signs of recovery. This process probably will continue until normal conditions are restored again throughout the country.

Automobile sales are increasing slowly in most of the great industrial centers, but there has been little actual sign of improvement in the cities which are the trade centers of the agricultural districts. It is logical to assume that the farmer will be a poor prospect until the purchasing power of the dollar comes up to meet the values of the goods the farmer has to sell. The best sales prospects are to be found in cities with diversified manufactures. One industry cities, such as Akron, where depression has hit them at all, have suffered most.

Taken as a whole, the Southwest and the South seem to offer the poorest trade fields at present, while the outlook is most hopeful in the larger cities of the East and Middle West. Dealers in the oil fields of Texas are enjoying the best business in years and sales are normal in Southern California.

### New England Business Better

New England, with its thousands of textile mills and shoe factories, was the first to bear the brunt of depression, and it is significant that business is better in Boston. Other industrial centers which show improvement include Buffalo, Cleveland, Detroit and Milwaukee. The effect of the great shrinkage in the value of agricultural products is evidenced by slow sales in Minneapolis, Des Moines, New Orleans and Atlanta.

The "spottiness" of conditions is best shown by the fact that while dealers in Dallas, Texas, territory are thriving as never before, those in Austin, Texas, report very little business. While trade is normal in southern California, it is not so good in the San Francisco territory and it is at a standstill in Oregon.

These facts are disclosed by painstaking investigations by correspondents of

## SALES CONDITIONS AT A GLANCE

Here is a birdseye view of retail automobile sales conditions in the principal distribution centers of the United States:

### SALES BEST IN YEARS

Dallas, Texas

### SALES NORMAL

Los Angeles

### SALES IMPROVING

Boston, Buffalo, Cincinnati, Cleveland, Detroit, Denver, Philadelphia, Kansas City and Milwaukee.

### SALES AT STANDSTILL

Atlanta, Austin, Tex., Chicago, Des Moines, Indianapolis, Minneapolis, New Orleans, New York and Portland, Ore.

AUTOMOTIVE INDUSTRIES in twenty cities. It is significant that while there has been little increase in actual sales in nearly half the cities covered, the feeling of dealers is much more hopeful than it has been for months. They believe the turn of the tide is near and that the new year will bring a slow but steady improvement, with conditions approaching normal at the close of the first quarter. Their expectations are based upon a marked increase in the size of live prospect lists. If they can sell cars to even half the persons who have announced that they propose to buy in the spring, they will clean out their stocks in a very short time.

### Surplus Reports Conflict

There are many conflicting reports regarding the surplus of cars held by manufacturers and dealers. So far as can be learned, however, the stocks on hand in most cases are sufficient to supply the normal trade for not more than two months. Dealers believe that unless the factories are in position to get into production rapidly, there will be a shortage of cars by April. This belief is largely speculative, but it is very generally held and is shared in large measure by the manufacturers themselves. Parts makers are laying in supplies of materials and the producers of complete vehicles do not propose to be caught napping.

Practically all the automobile factories in the country are closed at this time for inventory taking. Most of them have announced that they will reopen this week or next. It is possible that the period of idleness may be extended, but there is no reason to believe the action of Henry Ford in keeping his enormous plants down until Feb. 1 is symptomatic

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## New York Dealers Do Not Fear Future

Sales Slack in Holiday Period  
but Car Shortage Feared  
in Spring

NEW YORK, Dec. 31.—Automobile sales were practically at a standstill in New York as the year closed. In some lines the month had been fairly good up until Christmas when business dropped off as it always does just before the show—and perhaps a little more so. One or two big factory branches report almost no sales, wholesale or retail, in the final week of the year.

Dealers, however, are showing no signs of lack of courage and are going ahead with extensive advertising plans in connection with the show. Opinion is unanimous that the show will start business, which will show a steady gain until spring. Several distributors declare a shortage of cars in the spring is inevitable unless the public shows an unexpected willingness to accept some of the used cars now glutting the market. In fact, the abundance of used car offerings is an obstacle to new car sales right now, as most of the dealers are declining to do much trading and a large majority of new car prospects are standing firm against purchases with their old cars left out of the transaction.

Business in light trucks is better than it was, which is accepted as a healthy sign of returning business in all lines. Heavy duty trucks are selling very slowly.

## BOSTON

BOSTON, Dec. 31.—Sales conditions in Boston have improved. The dealers have looked the facts in the face and decided to get down to earth and try what real salesmanship could do. They are selling cars again, not in big quantities, but they are doing some business. Dealers have held conferences with their salesmen and mapped out campaigns instead of sitting down waiting for customers. Salesmen now are calling upon people and talking motor cars like the men who sell insurance, mortgages and other things that are not peddled out over a counter, with the result that those who tackled the job first are getting somewhat ahead of those who lagged behind.

Some of the dealers have been going along doing a very fair business, others pretty fair and more of them very little. There has been a picking up in used cars and trucks also, and it begins to look now as if the new year would see sales slowly increase.



# Industrial Centers Best Markets

## Slump Crest Past, Detroit Believes

Dealers Feel Sales Stimulation—  
Continued Upward Trend  
Expected

DETROIT, Dec. 31—The crest of the slump has been passed is the opinion of a majority of dealers as indicated in the December improvement over that of November. Following are reports by the Packard, Hupmobile, Dodge and Overland distributors.

Simons Sales Co. (Overland) says September was 10 per cent better than last three years; October was 5 per cent better than the last three years; November was 48 per cent less than the last three years and December to date 100 per cent better than November. Guy O. Simons, the president, says that there are more orders on file for delivery in January, February and March than ever before.

H. W. Peter, general manager of the Packard branch sales, said last week was not as good as the same week in November, but prospects for an increase in January will be good followed by a greater increase in February and there will be a big business in March. Summing it all up, Peters said the greatest trouble the Packard Motor Car has, is their used car problem. Every prospect wants to dispose of their old car before taking a new one.

S. E. Comstock, general manager, and T. J. Doyle, Dodge distributor, report an increase in December of 33-1/3 per cent over that of November and \$18,000 more in revenues from used cars delivered in December than in those traded in. Doyle sold 47 used cars in November. The wholesale business is not so good because the upstate dealers are having trouble with the local banks. Reports from dealers and salesmen indicate marked improvement in January, to increase in February and begin real business in March.

Williams & Hastings, Hupp distributors, said December was not so good as November, but December is always the worst month in the year and prospects for January show marked improvement which will be steady until spring when the demand will exceed supply.

## INDIANAPOLIS

INDIANAPOLIS, Dec. 31—Conflicting opinions of various Indianapolis retail dealers make it impossible to come to any definite conclusions as to immediate future of the local automobile business. Con-

ditions are stationary at present—just about what they have been for some time past with no immediate prospects of a radical change. Cars are being sold at about the same rate as for the past few months. The open fall and winter undoubtedly resulted in stimulating the market for open cars.

## BUFFALO

BUFFALO, Dec. 31—The outlook for the automobile business in Buffalo and the surrounding territory during the next three months is decidedly encouraging according to Buffalo's foremost distributors who declared to-day that the number of live prospects is gratifyingly large, that interest by potential buyers is much keener than it was and that an increasingly large number of inquiries are coming in.

## CLEVELAND

CLEVELAND, Dec. 31—The retail automobile trade in Cleveland reached its lowest point approximately 30 days ago and the dealers assert there has been a gradual improvement since the early part of December. The trade is much better now than it was in November and the Christmas shoppers boosted business. Some retail business is better in Cleveland than in the district outside of the city.

There has not been a sharp rise in the volume of buying from retailers here, but a slow and moderate growth with enough inquiries to lead dealers to believe that there will not be a backward tendency.

## PHILADELPHIA

PHILADELPHIA, Dec. 26—Actual selling conditions here show a slight upward tendency in new passenger cars and somewhat more decided impetus in used cars. Truck sales are dull and accessories are not moving to any appreciable extent. This division of the industry appears to be the worst off unless it is the tire trade.

It cannot be said, however, that there is any recessionary movement here as regards the automotive industries. Summing it all up, there is only a little improvement altogether, but this is sufficient with the promise held out of more than usual interest in the passenger car show from Jan. 15 to 22 to cause optimism in the trade not only for the next three months but thereafter.

## Kansas City Getting More Calls for Cars

Retail Sales Steadily Increasing  
—Public More Ready  
to Spend

KANSAS CITY, MO., Dec. 31—Wholesale distributors of passenger cars are receiving more calls for cars. They report that business is already picking up and gives promise of much expansion shortly. Retail sales in Kansas City have steadily increased during the past few weeks and would be much larger if dealers were willing to make more trades. Nearly every dealer has had more inquiries. One dealer in a moderate priced car said he would have a retail trade above normal if he would take in more used cars. Another dealer in moderate priced cars has had a fair business in new cars, selling a number normal for this season, and a really good business in used cars. Several sales a week are being made by some dealers in higher priced cars.

There is a perceptible relaxation in the public's resistance to spending money, which is being stimulated by the cut price sales in department and clothing stores. Many thousands of people here had made up their minds not to buy anything until after Christmas or after the first of the year and it is believed that when business men take inventory, when salaried men find out whether or not they still have jobs after the first, and people know how they are entering the new year, all business will be more stable and more lively, even though some weak merchants and distributors, not referring to the motor car industry, have to liquidate.

An unusually large proportion of the sales this winter have been to women and most dealers report an extraordinarily large number of women being taught to drive.

## MILWAUKEE

MILWAUKEE, Dec. 31—State representatives of automobile companies here are showing increasing orders for spring delivery about 10% above that of a year ago. Local dealers are wrestling with problems of how to dispose of used passenger cars and have thus far been obliged to decline many tempting trades involving new sales. Business is always slow at this time, however, especially on open used cars.

Several dealers are planning special advertising and selling campaigns in  
(Continued on page 40)

# Buying Is Slack in Farm Districts

## South Not Looking for Recovery Soon

### Does Not See How Money Can Become More Plentiful Before Next Harvest

NEW ORLEANS, Dec. 31—Retail automobile sales conditions here are almost at a standstill and the upward impetus given by the pre-Christmas show seems to have died out within a week after the show closed. The majority of the dealers admit they have more cars, either in warehouses or in depots, than they can sell. Dealers in cars whose makers reduced prices report that there is some movement in Louisiana, Mississippi and east Texas, but in this city conditions are dull. This dullness is largely due to small receipts for sugar, rice and cotton crops, but dealers profess to believe that after the end of January, when the farmers know more definitely what they are going to get for their crops, business will be better.

The prices for all staple crops, as well as for seafood products and lumber, on which this State's business prosperity depends, are very low to the producer, while labor is high, and it is difficult to foresee just how money can be any more plentiful before another harvesting season, which will be next fall. Dealers in the highest-priced and lowest-priced cars seem to be having a little the best of the automobile business, the middle-priced car doing the least business.

## AUSTIN

AUSTIN, TEX., Dec. 31—Automobile dealers in the Austin territory, as well as throughout the cotton growing region of Texas, are feeling the depressing effects of the slump of cotton prices and the consequent slump in general business. Farmers are placing orders for very few cars at this time, a condition that the trade has not felt for several years. Merchants and other business interests dependent to a greater or less degree upon the prosperity of the farmer are likewise holding off in buying cars.

No early improvement in conditions is expected. On the contrary, the crisis has not yet been reached, according to the views of bankers. It is stated by retail dealers that deliveries they are now making are of cars ordered some time ago. There continues to be considerable buying of cars, but chiefly of the cheaper type, which are essential to certain lines of business. Most of the orders come from professional and business men who have not yet felt the effects of the big

drop in cotton prices. Little hope is held out that trade conditions will improve during the next three months unless there should be a material increase in the price of farm and range products, which is regarded as unlikely. It is estimated that of the 4,200,000 bale cotton crop which Texas made this year more than 2,000,000 bales are still in the hands of the farmers.

## Los Angeles Enjoys Normal Winter Sale

LOS ANGELES, CAL., Dec. 31—Automobile selling conditions in southern California are normal. Both passenger cars and trucks are accumulating and being warehoused, but this has been the history of the industry at this season for years. When dealers in other sections of the country stop deliveries, factories always seek an outlet here, due to climatic reasons, and usually make an extra inducement to the dealers to stock heavily, and unless changes in models are likely the dealers usually comply, so there should be no alarm felt over heavy stocks now on hand.

The Los Angeles bank clearings for 1920 will reach \$4,000,000,000, against \$1,500,000,000 in 1919. The banks here have rediscounted less paper than those in any city of similar size in the country.

According to reports prospects for automobile business are to be regarded as favorable. December may show a slight falling off in sales, more so than in November, but not in an alarming way. Indications for the next three months show that sales will prove as good as in previous years, January and February usually being light months. November saw more sales than October and only 203 less than September and 19 less than August. The dealers could stimulate the new car business remarkably by loosening up on trade-in allowance, but the used car market is glutted and sales are very poor.

## DALLAS

DALLAS, TEX., Dec. 31—There has been no business depression so far as the automobile dealers of Dallas are concerned, nor do indications point to any slack selling period for the next several months. This section of Texas is prosperous and the people are buying more automobiles than ever before, the dealers declare. A new idea was developed in Dallas and other Texas cities during the holidays and that was buy a car for Christmas, and many of them went as Christmas gifts.

Since the recent reductions in prices were made the dealers have enjoyed the

(Continued on page 40)

## Northwest Buyers Want Cars; No Cash

### Sales Practically at Standstill Be- cause of Low Prices for Crops

MINNEAPOLIS, Dec. 31—Summarizing the northwest territory as a whole, automobile business is practically at a standstill. Although locally in large centers there is an improvement in sales, the outlook for the next three months is not bright. The trouble seems to be that the farmer is paying for clothes and food at the same prices he paid six months ago but crop prices are lower and he is therefore holding his products.

The disposition of both the retailer and buyer seems to be favorable toward the purchasing of cars, but the bankers probably will not be able under the present financial conditions to help the deals through. The opinion seems to be that if 30% of the delivery of cars is made, dealers will be doing well. There is a possibility that in some spots December business will be better than that of November, but it is hard to find any bullish opinions. The sudden arrival of winter has reduced the late driving appreciably which will have unfavorable reflex action on the sales situation also.

## PORTLAND

PORTLAND, ORE., Dec. 31—The new year means more to automobile dealers here than a few good resolutions. They expect it to mark the turning of a new leaf in business conditions that will affect all lines, the selling of automobiles included, although no sudden wave of buying is looked for the instant 1921 arrives. But the dealers believe it will mark the definite opening of a new era of better times. Probably the orders will not be numerous before mid-February or early March, but almost without exception they expect conditions to be on the upgrade from and after Jan. 1.

This will be in line with normal precedent. November and December always are dull months for the automobile trade in the Pacific Northwest. There always is a good buying trend in February and March. This year the Portland midwinter automobile show, Jan. 10 to 15, is an added factor.

While not many orders are expected from the show, it is expected to give a first-class prospect list from which buyers may be plucked in the spring. Conditions since Nov. 1 have been about stationary, with little buying.



# Ford Shaken by Internal Strife

## Three Officials Resign Positions

**Klingensmith, Brownell and  
Turrell Sever Connections—  
Report Large Surplus**

DETROIT, Jan. 3—Lack of harmony in the Ford organization, which developed a near rupture at the time of the sensational price cut, has resulted in the resignations of F. L. Klingensmith, executive vice-president and general manager of the Ford Motor Co.; L. H. Turrell, chief auditor, and Charles A. Brownell, advertising manager.

Brownell is leaving ostensibly on account of the health of his wife, but to a representative of AUTOMOTIVE INDUSTRIES admitted yesterday the fact that Charles Sorensen, general manager of Henry Ford & Son, and E. G. Liebold, private secretary to Henry Ford, practically were in control of the big institution.

Further information on the resignations of the three officials was not forthcoming either from Ford or others, though it was stated that the resignations of W. B. Mayo, chief engineer; W. A. Ryan, sales manager, and W. E. Knudson, production manager, had neither been tendered or requested.

It is believed Sorensen will succeed Klingensmith as executive vice-president and will be inducted before the week-end. Ford will devote more time to the Highland Park plant from now on it is declared, and will attempt with the assistance of remaining officials to end the reported chaos in the dealer organization.

The presence of W. C. Durant in Detroit gave rise to a rumor that he might join Ford but officials who would talk pronounced it as without any foundation. Ford was more determined than ever to go it alone, they said, because of the general comment that in the loss of Klingensmith the company lost its greatest asset since Harold Wills quit the organization after a disagreement.

### Three Resignations Accepted

Liebold said there was nothing for him to say other than that he had been informed the three resignations had been accepted. He said no successors had been named to Klingensmith, Brownell or Turrell, but added the entire matter would be threshed out and settled in detail this week.

The friction appears to have resulted chiefly from the fact that Henry Ford has maintained his office at the tractor plant at Dearborn to the exclusion of the big Highland Park establishment,

where 51,000 of his employees work, and as a result received his only information from the Highland Park plant through Sorensen and Liebold; neither of them in close touch with Highland Park conditions.

It is known that there was bitter opposition to the price slashing from Klingensmith, on whom fell the burden of getting the money when it was needed. Klingensmith and other executives took the position that Ford sales would not be increased by the price cut, and at the same time business for the other manufacturers practically would be killed, thereby adding to public unrest and panicky conditions. Events bore out their prediction. For one week after the cut, Ford sales jumped enormously, but immediately thereafter slumped. Ford dealers throughout the country are overstocked, and it is stated by an official there are 125,000 surplus cars on hand, approximately six weeks' output at the Ford schedule of 4000 a day.

### Dealers Aroused by Changes

On the heels of the cut came the removal of territorial restrictions, which put Ford dealers in a most antagonistic attitude and resulted in a chaotic condition in the dealer organization. At the same time the protective clause on prices was lifted, still further endangering the position of the dealers and adding to their already heavy burden. Under conditions as they exist to-day, Ford can cut his price over night and the dealer, with his warehouse and salesroom full of cars, has no protection whatever. He must stand the loss, whereas in the past the thirty-day clause in the dealer contract gave him full protection.

The slump that followed the price cut after the first week, in the opinion of Highland Park executives, made it imperative that the production be curtailed or stopped temporarily until the dealers could unload. Instead, the order went forth to speed up. As a result October proved a record-breaker, from a production standpoint, the company turning out 99,967 cars and trucks. The November output was 93,000 and the December total was 73,000.

In the face of this enormous production, and the fact that dealers already were heavily overstocked, came the official announcement that the company would shut down Dec. 24 to reopen again Jan. 3. Orders to parts makers, who had been closed, were to get into production Monday, Dec. 27, to prepare for the opening of the Ford plant.

Meanwhile the question of finances began to loom, for the reason that there were unpaid dealer drafts amounting to \$12,000,000 outstanding, and it is said Klingensmith, whose chief duties lay in

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## American Dunlop To Finance Self

**Negotiations Are Opened With  
Bankers in Which British  
Company Takes Part**

LONDON, Dec. 24 (*Special Correspondence*)—Directors of the Dunlop Rubber Co. have reached the conclusion that the time has come for the American Dunlop Co. to finance itself and negotiations to this end now are under way. There has been some perturbation among the stockholders of the British company over the position of the corporation, and to allay apprehension, the directors issued the following statement:

"Within the past few weeks the company has been called upon to assume the responsibility of providing the additional finance required to place the American Dunlop Co. in a position to complete the construction and installation of its factory and to provide sufficient working capital to enable that company to carry out its first year's trading program.

"While the Dunlop Rubber Co. is under no liability to provide this additional finance, the board recognizes that it is in the interests of the company that the American enterprise should be carried on, and in accordance with the statements made at the last meeting of shareholders held on Sept. 10 last, the greater part of the sum of 1,000,000 pounds (\$5,000,000) has been remitted during the last few weeks.

"The directors, however, feel very strongly that the American company should now take steps on its own initiative to provide the further funds required to bring the undertaking to completion, and important negotiations, in which this company is assisting, are now pending for this purpose, but it is not expected they will reach finality for several days. The moment a definite statement on the subject can be issued, a full circular will be addressed to the shareholders of the Dunlop Rubber Co. dealing with this matter and with the position of the company generally."

### BRAZIL KEEN ON FINES

WASHINGTON, Jan. 3—The Chamber of Commerce of the United States has sent out a warning to American shippers telling them that unless all regulations regarding Brazilian consular invoices are rigidly observed, they result in fines being imposed on consignees in Brazilian ports. It is explained that custom house officials in Brazil receive 50 per cent of all fines levied on consignees taking their wares from custom houses. This encourages fines for the slightest deviation from invoice regulations.

**DALLAS***(Continued from page 38)*

best business of years. From the inquiries the dealers are having concerning new models or new cars it would appear a good business in the Dallas territory is assured for the coming year. Dealers say the car priced at from \$1,800 to \$3,000 is the favorite now. Heavy orders are being placed and the dealers are in a position to care for the business without any great assistance from the bankers.

**ATLANTA**

ATLANTA, Dec. 31.—Several dealers to-day expressed confidence that business would pick up considerably after the first of the year, but the consensus of opinion is that there will be no return to normal conditions for several months unless cotton should climb to price that is double the present quotation. The holiday business is fairly good considering the recent period of depression and the dealers state many prospects promise to buy early.

In 1921, if all these sales develop, the dealers say the demand will exceed the supply. The next two or three months will witness only the beginning of return to normal conditions, which dealers do not believe will fully materialize before late spring or summer. Very few sales are being made now, and it is certain the trend will not be backward, for money is becoming less tight and the dealers say this will mean slow but gradual increase in sales from now on. All business lines are doing everything possible to restore public confidence.

**DENVER**

DENVER, COL., Dec. 30.—Although many dealers are still gloomy over the present conditions, others point out that December is usually a dull month and some have had reasonably good business during the month at that. The upward trend has already been felt by few during the last few days through sales and prospects, and there is substantial confidence of a gradual gain during the next three months, particularly February and March. Please tell Adair that the selling story is delayed because Heiser is sick, but hopes to give me an interview early next week and has by far the best record in Denver sales right now.

**CINCINNATI**

CINCINNATI, Dec. 31.—Automobile dealers in the Cincinnati territory are optimistic over the prospects for the automobile industry in the future and are confident that business will begin to pick up after the first of the year. This increase is expected to materialize about February 1. From that date on sales

are expected to mount so that the trend will be well defined before the end of March. At present there is some activity here but not much.

None of the dealers is figuring on anything like a big business for the regular 1921 season. They realize that the market is or will be glutted with used cars, purchased during last year's scrambles, and that prospects for new cars will necessarily be limited.

It is the opinion of some dealers and especially of manager H. K. Shockley of the Cincinnati Automobile Dealers Association that several manufacturers, who have curtailed their production, will actually find themselves "short" and will have to hold off prospects for a few weeks on deliveries when the business comes. These include dealers who are holding production to the minimum, unwilling to take a chance against the future until the business actually is at hand.

**CHICAGO**

CHICAGO, Dec. 31.—No notable increase of sales of automobiles is evident in connection with the holiday purchasing of commodities and dealers are not in an expectant mood for immediate improvement. The reported increase in price of Franklin cars is expected to stimulate buying, which has been quiet for months, through the effect it will create on the public mind that other cars may likewise have their price values moved upward.

It can be said that show week is looked forward to with keen anticipation by all dealers as the real beginning for the return to normal in the automobile trade in this city. With that in mind every effort is being made to line up prospects now and have them ready when the coliseum opens. For the present, however, conditions remain unaltered generally from what they have been for the past few months. While there have been sales made they have not been made in such volume as to make the horizon any too rosy for the dealers.

### New Air-Cooled Car Designed by Horning

CLEVELAND, Dec. 31.—The Washington Automobile Co. of this city plans to produce a new air-cooled car to be known as the Washington Six from designs of Walter R. Horning, who was formerly engaged in the electrical equipment business. It will be an assembled car comprising such components as Timken axles, Delco electrical equipment, Borg & Beck clutch, Grant-Lees gearset and Thermoid Hardy universals. The engine is a six cylinder 3¼ x 4½ inch overhead valve design and the wheelbase will be 120 in. A rear axle ratio of 4.66 to 1 will be used. Oilless bushings will be extensively used, and a Harrison ventilator will be fitted to vary the cooling effect in accordance with atmospheric temperature.

**MILWAUKEE***(Continued from page 37)*

January or February after the income tax period and are depending on the severity of the weather to sell for spring delivery on liberal deposit. Provided these plans get sufficient reaction, and it is expected they will develop formidably though intensive salesmanship, business will truly open up on sane basis.

At several private conferences the dealers expressed decidedly more confidence in the next three months. They do not expect a boom period but do expect a response exactly in proportion to hard sales work. They declare that practically all owners who trade in annually and for new cars are anxious to get action as soon as possible, showing there is plenty of money among the present owners. Lower-priced cars are not expecting anything like the rush of two or three years ago, of course, but they feel sure they have a sound and healthy business which will more than make up for the reduction in boom volume.

Trucks are selling slowly and the tractors are not expected to revive for several months more. The public is still talking about further price reduction in all automotive lines but is impressed by their failure to get cut prices now. The dealers are all standing pat.

**DES MOINES**

DES MOINES, IOWA, Dec. 31.—Automobile conditions are practically stationary in Des Moines territory. One distributor had twelve salesmen in the field during the entire month of December and they failed to bring in a single order for immediate delivery. The prospects for spring business are good but little business is expected the next sixty days. To show the trend during the past sixty days, of 1000 registrations issued in 25 counties in Des Moines territory, more than 800 were for Fords. Relief from present conditions is dependent upon the credit situation. In the farm produce market there are signs that the movement of grain has started and this will tend to improve the situation, but it will be slow.

**HENDEE BUILDS POLICE CARS**

SPRINGFIELD, MASS., Dec. 30.—The New York police department has bought of the Hendee Mfg. Co., eighty-eight motorcycles and side cars for use in the suppression of the crime wave in that city. The motorcycles will be equipped for patrol duty, to carry driver and passenger heavily armed. It is believed that the free use of motorcycles will be effective in dealing with automobile bandits. The same corporation has received large orders from Boston and Philadelphia, making a total of 221 motorcycles and 153 side cars ordered for these three cities.



## Automobile Sales at Retail Spotty

Dependent Chiefly on Local Business—Little New Discussion on Prices

(Continued from page 36)

of the industry as a whole. Ford produced at top speed all of last year and probably has a considerable surplus on hand. A few other manufacturers are in the same position.

Except for the announcement that Franklin will raise his prices slightly, there has been little discussion of late of the price question as it relates to finished cars. In this respect there seems to have been more or less stabilization. It may be significant, nevertheless, that manufacturers of parts and accessories are announcing reductions. The expectation in some quarters is that companies which gave price guarantee in lieu of reductions may announce readjustments during the show. Much importance is being attached to the sales stimulation which will result from the New York and Chicago exhibitions, and everything possible will be done to extract from them every possible benefit to the industry.

Production to-day is at a low ebb, but the outlook is more hopeful than it has been in six months. Sales very largely depend upon the stabilization of retail prices in general at more normal levels and there are many indications that retailers in various lines are resigning themselves to the inevitable and are preparing to pass on to the ultimate consumer some of the substantial cuts which have been made in retail prices.

### FORT WAYNE PLANTS CLOSE

FORT WAYNE, IND., Dec. 31—The Dudlo Mfg. Co. of this city has closed down all its departments which were engaged in the manufacture of products used by the Ford company. About 700 employees have been thrown out of employment indefinitely by this shutdown, this number including 75 employees in the New Haven branch and 30 employees in the Peru branch. The Dudlo company manufactures insulated wire. About 300 employees engaged in the manufacture of products which are not used by Ford still are at work.

The Harry Andrews Paper Co. of this city has also been affected by the Ford shutdown. The Andrews company supplies Ford with a paper composition used for the inside doors of Ford cars.

### COMPLETE HIGHWAY LINK

MASON CITY, ILL., Jan. 3—The largest stretch of paved road which has yet been completed under the Federal Aid Act, has been formerly dedicated. It constitutes a link in the Chicago—St. Louis highway extending from Sparland to Chatham, a distance of 117 miles. The entire road is paved with concrete and it passes through Springfield and Peoria.

## STUDEBAKER QUILTS WAGON MANUFACTURE

SOUTH BEND, IND., Jan. 3—Manufacture of the famous old Studebaker line of wagons will be discontinued and the entire facilities of the Studebaker plant here will be devoted to the production of motor cars. Some time ago the carriage and harness ends of the business were closed out, but the manufacture of farm wagons and heavy vehicles for army purposes was continued until the present time.

## Newark Factories

### Cut Down Operations

NEWARK, N. J., Dec. 31—A survey of important plants in this section of New Jersey indicates an almost complete stoppage of production in many cases, while other firms are simply holding together skeleton organizations.

Hyatt Roller Bearing Co. shut down on Dec. 24th and expects to resume production Jan. 3. An announcement to employees stated that all departments will resume at the same time, but with forces of a size proportionate to production necessities at that time.

Splitdorf Electrical Co. is holding together its office and shop organizations, but has reduced production very materially.

After a two-weeks shutdown, Gould & Eberhardt will start production again on Jan. 5. A force of 270 men will be put to work at that time, and gradually increased as necessity demands. The working force at this plant numbers about 900 under peak-load production conditions.

In contrast to the generally depressed situation in this district, the Rubber & Celluloid Products Co., which employs about 80 men, is maintaining its working force intact, although some decline in volume of business has been experienced.

### TO USE NEW RAUSIE ENGINE

SPRINGFIELD, OHIO, Jan. 3—The Martin Aircraft Co. of Cleveland will equip one of its large commercial airplanes with a Rausie Big-Six engine of 250 hp. A new design of engine with four valves per cylinder and double camshafts will be submitted to the Government for the air mail service. This engine will be equipped with an electric starter.

### A CORRECTION

Hanson & Tyler Co., Fort Dodge, Iowa, which has made an assignment to creditors, was not agent for Chandler and Cleveland cars as was stated at the time the assignment was announced. These accounts with the Hanson-Tyler company were closed April, 1919 and since that time have been in other hands.

## Excise Tax Refund Sought in Canada

Deputation of Dealers Request Return of Money on Unsold Cars

OTTAWA, Dec. 31—A deputation of Motor car dealers, 400 strong, coming from all points in Canada, from Vancouver to Halifax, waited on Sir Henry Drayton, Minister of Finance, to urge that the excise tax paid on unsold cars in stock at the time of the recent repeal of the excise tax be refunded.

In the brief presented on their behalf by E. M. Trowern of Ottawa and supported by G. M. MacWilliam of Toronto, and J. H. Fortier of Montreal, it was pointed out that in collecting the excise tax on motor cars at their Canadian source (point of manufacture or port of entry of domestic manufactured and imported automobiles respectively), the motor car dealers were discriminated against, as this procedure not only aggravated the already difficult credit situation, but also militated against sales during the life of the excise or so-called luxury tax.

This adverse discrimination unfortunately, like the "evil men do," survives the tax in a much more grievous form, for while on clothing, shoes, jewelry, etc. (collected by retailers at the time of sale) the tax was automatically dropped at the time of the repeal, it remains on motor cars that were in dealers' stocks at that time, as a result of which the dealers must take it as a loss.

The tax, 15 per cent on cars under \$3,000 and 20 per cent on cars at \$3,000 and over, in many cases approximately equals the dealers' profit. It was further pointed out that owing to the buyers strike and credit stringency, the loss a large proportion of dealers would be compelled to face was beyond their power of absorption. Consequently many would be bankrupted and others would be paralyzed. Some dealers stand to lose as high as \$60,000 on the tax alone unless it is refunded.

### LABOR NEARS PRE-WAR BASIS

HARRISBURG, PA., Dec. 31—Reports to the central office of the Pennsylvania State Employment Bureau are said by the officials to indicate that labor of all kinds is rapidly returning to its pre-war status and the Pennsylvania labor turnover is decreasing. It is believed conditions will be back to normal in virtually all trades in January.

### HAYES WHEEL STAYS DOWN

DETROIT, Jan. 3—Hayes Wheel Co. at Albion, which had been closed for about two months and which was reopened Monday, was closed again Wednesday following the announcement that Ford would not reopen. The company manufactures hubs for Fords almost exclusively.

## Goodyear Passes January Dividend

### Statement Declares Impairment of Capital Made Action Un- avoidable—Add Directors

AKRON, Jan. 3—Explaining to stockholders that the present impairment of capital made its action unavoidable, the Goodyear Tire & Rubber Co. passed its quarterly preferred dividend which fell due Jan. 1, at the same time issuing an official statement to the effect that preferred dividends, being cumulative, would be paid before any further dividend is paid to common stockholders.

Announcement of the company's action was made following an adjourned meeting of stockholders at which several changes in the company's code of regulations were voted. Principal among these changes is the decision to increase the number of directors from seven to eleven. Stockholders also ratified change of the fiscal year to correspond with the calendar year instead of ending on Oct. 31; voted to hold the annual meeting in March instead of December, and empowered officials of the company to create finance and executive boards.

In announcing the company's inability to declare the usual preferred stock dividend, officials in formal letters to stockholders said:

"Your disappointment in not receiving the quarterly dividend on the preferred stock held by you, due on Jan. 1, 1921, is no greater than that of your board of directors in not being able to pay the same on that date. The plans for the refinancing of our company, which we expected to have fully completed at the time of the first adjournment of the special meeting of stockholders several days ago, are not yet fully consummated. Until these plans have been completed and the present impairment of the company's capital, as shown by the audit made as of Oct. 31, 1920, and which was presented to stockholders Dec. 29, has been restored, the company would have no legal right to pay this dividend even though it had at present funds to do so.

#### First Duty to Creditors

"The company's first duty is to make satisfactory arrangements with its creditors before any dividends are paid to the stockholders.

"These dividends are cumulative and when payments are resumed all dividends in arrears on preferred stock will have to be paid before any dividend is paid to the common stockholders. We hope to announce in the very near future the completion of the plans now under way for the company's permanent financing."

The annual audit showed a deficit of \$15,647,653 in addition to anticipated losses of approximately \$19,000,000 on contractual obligations for rubber and fabric.

Much to the surprise of stockholders attending the adjourned meeting on Dec.

29, officials of the company were unable to announce definite and satisfactory consummation of the refinancing negotiations, and asked a second adjournment for two weeks in order to permit more time for carrying on the negotiations. It is understood in Akron that an eleventh hour hitch in the tentative negotiations arose, due to terms of the Eastern banking group expected to negotiate the loan to the extent of \$40,000,000 or \$50,000,000, which were regarded as too exacting by Goodyear officials.

#### Tried Other Financial Groups

This unexpected development, it is reported, caused Goodyear representatives to turn to other financial groups in the hope of pushing through the refinancing upon terms more satisfactory and acceptable both to officials and stockholders of the company. The permanent refinancing must be consummated by Feb. 15 to replace the temporary loan of \$28,000,000 advanced through the Goldman-Sachs Co. of New York, and which matures on that date. There is a possibility of extension of this loan, officials state, should the permanent refinancing plans be further delayed.

In casting about for new and more friendly financial interests to tide the Goodyear company over its present crisis, it is understood officials turned to J. Pierpont Morgan and the banking group represented by him. Latest available and tangible information received in Akron from Wall Street indicates that the company is experiencing considerable difficulty in interesting the Morgan interests in the refinancing venture.

Wall Street is known to be none too friendly to Goodyear, due to the fact that the company through the financial strategy, business ability and genius of its president, F. A. Seiberling, who in Akron is known as the "Little Napoleon," prior to this time has been able to carry on its previous refinancing without the aid of Wall Street, and therefore has declined proffers of aid from Eastern banking groups.

#### Called for Stock Control

The original terms, upon which the original banking group consulted, offered to absorb the Goodyear issue of \$40,000,000 in first mortgage gold notes, are said to have included a stipulation that the financing group be assigned control of fifty-one per cent of the Goodyear participating stock during the tenure of the loan. This President Seiberling is endeavoring to avoid. The original terms also included a virtual mortgage on the Goodyear plant and a commission of 2½ per cent on net profits during the tenure of the loan, in addition to the interest charge agreed upon.

#### HARDMAN RECEIVER NAMED

NEWARK, N. J., Jan. 3—Vice Chancellor Foster has appointed Chester N. Farlie receiver of the Hardman Tire & Rubber Co. of Belleville. The application was made by the Rubber Importers & Dealers Co. of New York for a judgment claim of \$3,336.

## Franklin Completes Largest Sales Year

### Production of 10,500 Represents 1500 Increase — December Output Totals 1000

SYRACUSE, Jan. 3—Franklin Automobile Co. has announced completion of its biggest year and the establishment of several new records. Despite the almost complete let-down in selling during the autumn months the Franklin company has sold and delivered ten thousand five hundred cars during the year. Of this number one thousand have been delivered to customers for immediate use during the month of December. This is the largest December in the history of the company and is considered indicative of the growing popularity of the air-cooled car for winter use.

Figures for the entire output in 1919 were 9173 cars, of which number 828 were sold during December. December, 1918, the Franklin company sold 234 cars. The production schedule of the preceding years never approached the figures of 1919 and 1920. The largest single day's delivery during the past month was Dec. 29 when seventy cars were shipped. They were sent to all parts of the country and not to any distributor who contemplated storage for future delivery.

## Harvester to Deliver First Light Trucks

SPRINGFIELD, OHIO, Jan. 3—Preparations have been made by the Springfield works of the International Harvester Co. to usher in the new year by delivering the new high speed trucks to the trade. The first truck will be placed on exhibition in the lobby of Hotel Shawnee, permission having been granted by Manager Charles T. Gauvey. The new truck will be shown at the Columbus show in January and at the Springfield show in February.

Preparations are being made to increase the force at the Springfield works to 3000 before the end of 1921. About 1200 men are at work now getting out the new trucks and working on bodies for the Akron plant.

#### WINTHER BUYS TRUCK CONTRACT

SPRINGFIELD, MASS., Dec. 30—The United States contract held by the Sinclair Motors Corp. of this city was obtained by the Winther Motor Co. of Kenosha, Wis., for \$10,000, the sale being authorized by Referee Charles W. Bosworth at the adjourned meeting of the Sinclair company creditors in bankruptcy court here. The deal was negotiated through the trustee in bankruptcy of the Sinclair Motors Corp. It was reported by Referee Bosworth that the contract carries with it all of the assets of the Sinclair company intended for use in constructing the trucks.



## Factories Resume on Low Schedules

### General Operation Still Month or More Away—Wages Cut 20 Per Cent

DETROIT, Jan. 4—Between 8000 and 10,000 men went back to work in automobile factories here yesterday and today. While it is the plan of the manufacturers to increase forces and production steadily it is admitted freely there will be no real resumption for a month at least.

Wage schedules in all plants which reopened yesterday have been cut around 20 per cent, but no complaint has been received and workmen, after weeks of idleness, are apparently eager to return at the reduced scale. The stopping of the Ford and Dodge plants simplified the wage problem and plenty of labor is now available at a reasonable wage. Best of all, manufacturers say, the returned workmen are full of pep and are apparently ready to give full return in service despite the wage reduction.

It was stated unofficially that the Dodge plant will be down indefinitely. General Manager F. J. Haynes declined to predict the date of resumption or the schedule likely to be in effect on reopening. Practically the entire force of 22,000 men are off, though a few hundred have been given work cleaning and overhauling the plant and parts department. Dodge continued to have a heavy output in October and November. Dealers are heavily overstocked and thousands of cars are stored.

Cadillac is still taking inventory and will not get back to production before next week, according to Lynn McNaughton, general sales manager. He declined to say how many men will go back next week or what the output would be.

Packard reopened yesterday with about 50 per cent of the regular force. Officials say they will increase the force as circumstances warrant. Production will be confined to closed jobs on the single six chiefly and only in keeping with demand.

#### Studebaker Starts 400 Men

Studebaker opened plant No. 5 yesterday with 400 men. They are getting the plant in shape for resumption of production next Monday in all the company's units as announced before the holidays. They will start on a schedule of 90 cars daily for all plants, increasing as conditions warrant.

Paige-Detroit began taking back married men yesterday and hope to get back into production as soon as the plant is in shape, probably by the end of the week. They will maintain a rate of 25 cars daily with about 1000 men working temporarily. The company has orders for January delivery totaling \$2,000,000 and for February of \$2,500,000. This, with the daily demand expected, will permit an increase to 35 cars daily by Feb.

1. A survey of Paige dealers on Dec. 1, according to H. C. Dart, advertising manager, shows fewer cars unsold in the country than the actual number of Paige dealers.

The Lincoln Motor Co. has about 200 men at work though not attempting to produce any cars. All its efforts are being centered in the parts departments. It expects to swing into production next week, though officials have not announced the schedule.

#### Chalmers to Start Monday

Officials of Maxwell-Chalmers say the Chalmers plant will open next Monday with about 300 men working on closed cars of both types.

About 75 men went to work at the Columbia Motor Co. yesterday in the parts department and they are getting the plant into shape for resumption of production. The date of starting has not been decided.

Other plants are still down so far as production of automobiles is concerned, though the parts departments in all factories are being operated except in the case of Hudson and Hupp which did not stop for inventory, continuing on the curtailed schedule in vogue the last two months.

The Essex plant is closed but both Hudson and Essex cars are being built in the Hudson plant at the rate of about 15 daily. Hupp is continuing its schedule of 35 maintained since Dec. 1.

Buick will get under way next Monday and will continue indefinitely the daily schedule of 250. Dort will not get started on its new model probably until the end of the month and Oakland and Olds expect to start next week with a short force and their output limited to the demand in sight, though a schedule of 100 for Oakland and 30 for Olds will be the starting figure. Reo has resumed production but is continuing on a short time schedule and building about 30 cars daily. Chevrolet will get under way by the end of the week on a production of 100 a day to be increased as demand justifies.

## Finds Country Stocks Down to Low Point

NEW YORK, Jan. 4—David Ludlum of the Autocar Co. was here to-day to visit the truck show and incidentally to impart as much optimism as possible to all he met. Ludlum came to New York from a two weeks' vacation in upper New York State, where he visited many country merchants. He had with him the December sales reports of his company. His optimism was founded on these two incidents. He said:

"I firmly believe that we are beginning a very big year. During my trip I have visited many country merchants. I found that they were so down in stocks that they could not supply the wants of their trade and they all are realizing that they must order goods and order them quickly. They believe that present wholesale prices are as low as can be expected. I predict good merchant buying at once and that it will be widespread.

## Akron Begins Work on New Schedules

### Goodyear Cuts Factory Wages and Salaries—January Orders Substantial

AKRON, Jan. 4—The Akron rubber companies resumed operations on Jan. 3, after being closed for the Christmas Holiday week, with every indication pointing to considerably increased production. There is a gradual absorption of Akron's estimated army of 20,000 unemployed men and a steady return to conditions approaching normal in the tire industry. Goodyear wages will be cut 12½ per cent Jan. 10, and all salaries from 15 to 20 per cent.

It is stated authoritatively by Akron manufacturers that Akron rubber and tire concerns start the new year with fully \$50,000,000 worth of new business on their books so far for the month of January. This estimate is conservatively made and is likely to be exceeded largely when all January orders are compiled.

This, according to business experts, is the most encouraging note in the tire industry that has been sounded since the period of retrenchment began last summer. It is not taken to mean, however, that the \$50,000,000 worth of business will result in increased production at once, but is taken to augur well for an early resumption of operations.

Practically all companies have surplus finished product on hand sufficient to accommodate January orders, but with orders continuing to increase as they have since Dec. 15, it is stated that this surplus rapidly will be worked down and will demand greater production at least by Feb. 15 in order to keep production apace with demand. The Goodyear company on Dec. 15 had over \$10,000,000 worth of business booked, with over \$5,000,000 more in new January orders received. Since that time other companies show commensurate amounts of January business.

The B. F. Goodrich Co. on Monday increased factory operating time, and put on many former employees for the first time in eight months.

#### Firestone on Firm Basis

The Firestone company is understood to be more sound financially than any other concern in Akron and to be prepared to increase production just as soon as the present surplus is worked down by deliveries on early 1921 orders.

The Goodyear company's business is coming in to such extent as to indicate an early necessity for increased production, but under the present temporary financing program, there is no possibility of the present payroll being increased. Should the Goodyear permanent refinancing replace the temporary loan of \$28,000,000 which matures Feb. 15 be consummated before the next adjourned meeting of stockholders, officials hope to be able to increase production.

## Ford Organization Shaken by Strife

Three Officials Resign Positions  
—Plant Down Indefinitely,  
Officials Declare

(Continued from page 39)

the financial end, then took the position that resumption of operations would be unwise until the big surplus of cars had been unloaded.

A long conference last Wednesday resulted in orders to parts manufacturers who had resumed operations Monday again to stop production for Ford indefinitely, and some of them, notably the Hayes Wheel Co., at Albion, which makes Ford hubs exclusively, promptly closed down after three days' operation following a shut-down of six weeks. At the same time orders went forth that the factory would remain closed indefinitely—certainly until Feb. 1. Officials said to-day there would be no resumption before Feb. 15 in any event, and most likely the shut-down would continue some time after that date.

Just what action took place with regard to the resignations at the conference Wednesday is not known. It was followed, however, by an all-day session Thursday, and Friday morning Brownell announced his resignation. He later gave out the statement regarding Klingensmith and Turrell together with the facts which brought about the crisis.

Brownell has been with the Ford company since 1914, prior to which time he had handled Ford copy in the firm of J. Walter Thompson Co. When he joined the organization the company was building 38,000 cars a year. The output for 1920 was 1,023,552. Brownell had been contemplating a trip to California for the health of his wife, though his plans were simply to take her to Los Angeles, where he owns an estate upon which his daughter resides, and leave her there for a time, returning to his duties in Detroit. His resignation, however, he said to-day, would give him opportunity to spend three months in the West.

### Turrell Regarded as Fixture

Turrell, formerly an expert accountant, has been with the Ford company nine years and, as the head of the accounting department, had actual charge of Ford finances, incoming and outgoing. He was regarded as one of the Ford fixtures. It is said Ford plans to abolish this position.

The resignation of Klingensmith, however, was the one big topic in banking circles and among automotive executives. Starting in as a bookkeeper with Ford about sixteen years ago, Klingensmith rose to the position where he was presumed to be head and shoulders above everyone else in the organization. He succeeded Mayor James Couzens as executive vice-president and general

manager, and much of the success of the company is attributed to his efforts. The fact that he denies his resignation is regarded in the light of a technicality, because he insists on the request coming from Henry Ford rather than Liebold or Sorensen, and his official announcement of his resignation is expected later.

## Willys to Maintain Present Car Models

TOLEDO, Dec. 31—C. B. Wilson, new vice-president of Willys-Overland Co., in a statement this week declared the automotive industry would be one of the first to right itself from the present depression. Local troubles, he said, threw the Willys-Overland plant out of balance and declared it would take some time to put the plant back on the basis desired by the owners, but assured Toledo that it would not be long until it would be in operation.

"There is no doubt of the well-laid plan of the Overland officials to operate on conservative lines on an economical basis. The product has been studied carefully and executives are laying plans for the future. There will be no new models brought out in 1921.

### Resume on To-Order Basis

NEW YORK, Jan. 4—Production at the Willys-Overland and Willys-Knight factories will be continued strictly on a "to-order" basis. No cars will be made in anticipation of demand for the present. Relative to the company's policy, Vice-President Chrysler said:

"We have materially reduced our outstanding obligations and have followed the policy of liquidating finished product. As a result our stocks in the field are very low and the total number of finished cars that we have at our warehouse in Toledo is less than 2200. Two weeks of business throughout the country would completely absorb every finished car."

### EMERSON PASSES DIVIDEND

ROCKFORD, ILL., Jan. 4—At the annual meeting of the Emerson-Brantingham Co., it was voted to defer action until the next meeting upon the resignation of J. W. McLachlan, secretary-treasurer. The quarterly dividend was passed, the following explanation being submitted: "Owing to the general trade and financial conditions, the directors of the Emerson-Brantingham Co. deem it advisable to maintain the company's finances in the strongest possible position, and, consequently, voted to omit the declaration of the regular quarterly dividend which would be payable Feb. 1, 1921, although the earnings of the company for the fiscal year, recently closed, were more than its dividend requirements for that period."

### INDEX TO VOL. XLIII

Subscribers who desire a copy of the index to Vol. XLIII (second half 1920) can secure same by sending their name and address and a request for the index to this office.

## South America Open for Continued Sales

Exchange Conditions Only Important Drawback to Big Opportunity—Roads Improve

NEW YORK, Jan. 3—A belief that American automotive manufacturers should not slacken their sales and service work in any of the countries of Latin-America was expressed here to-day by J. H. Wise, who has just returned from a business trip to Para, Pernambuco, Bahia, Rio de Janeiro, Sao Paulo, Santos and Rio Grande del Sur, Brazil; Montevideo, Uruguay, and Buenos Aires, Argentina. Wise, as a representative of Gaston, Williams & Wigmore, Inc., was placing agencies for the Peerless automobile and Selden trucks.

"Exchange conditions are the greatest hindrance to trade at the present time," he said. "But, due to the great natural wealth of these countries and the business betterment that may be expected in the coming months, this is no time to let up the slightest on foreign trade. Exchange with South America will return to normal much more rapidly than it will in Europe, and to one who has sufficient knowledge of the great territory of Brazil, Uruguay and the Argentine, there can be no doubt of the trade volume that we may expect in coming months.

"Service is a prime requisite for the exporter who expects to continue in the South American market. Now, when conditions are slackened here at home, is the time to undertake service and maintenance campaigns for the foreign field. Service literature is needed, education is required—all of which should be undertaken by the North American automotive manufacturer who would extend his business in the Spanish and Portuguese speaking countries."

### Sao Paulo Market Promising

Wise sees the Brazilian state of Sao Paulo, the center of the coffee-growing district, as one of the most promising fields for automotive sales. The city of that name, which is the capital of the State, is the third largest in population in the South American continent and already boasts of some 4000 automobiles. An improved road is now being built to the city of Campinas, which has a population of 150,000 and is located 105 kilometers to the north. The completed highway to Santos stands as an example of fine highway construction, and Wise reports an active project for the construction of an improved highway to connect Sao Paulo with Rio de Janeiro.

The touring car predominates in Sao Paulo, there probably being more five-passenger machines than any other design. But, as Brazilian families are apt to be large, there is a steady demand for seven-passenger models. The sale of cars with limousine bodies is not large, but among those who can afford them, this type is popular. The demand for sedan or similar enclosed cars is small.



## France Gets Bill to Quash Gas Tax

### Would Help Lift Industry from Slump—New British Tax in Effect

PARIS, Jan. 3.—(By cable to AUTOMOTIVE INDUSTRIES)—A bill has been brought before the French Parliament calling for the abolition of the state tax of 20 centimes a litre on gasoline on a caloric basis. This is equivalent to a tax of \$35 a ton on coal and is responsible in large measure for the present slump in the automotive industry. In February Germany will begin delivery of 35,000 tons of benzol a year in accordance with the terms of the peace treaty. It originally was intended to use this mixed with alcohol as automobile fuel but no alcohol is available, owing to the decrease in production. The Government now proposes to sell most of this benzol at cost to the French chemical industry and the rest will be put on the market. The automotive industry would have preferred to have all of it go on the open market in order to force down the price of gasoline.

The price of gasoline in England dropped 7 pence a gallon Jan. 1 but the 1 pound sterling horsepower tax went into effect at the same time.

A French law which went into effect Jan. 1 provides that no person can pilot an aircraft without a government license delivered after a thorough medical examination.

Swiss banks have advanced the funds necessary to continue the operation of the Piccard-Pictet. Liquidators have been appointed and it is probable the affairs of the company will be wound up.

The French Dunlop Co. has purchased the government shell factory at Mont Lucon, covering 250 acres and will use the property as a tire factory, but will not get into production until the end of 1921.

Dates have been fixed for the London automobile shows to bring them after the Paris exhibition. Trucks will be shown from Oct. 14 to 22 and passenger cars from Nov. 4 to 12.

A new tire company is being formed in Turin with a capital of \$5,000,000. It is believed the Fiat Co. is financially interested.

Entries for the French Grand Prix, which closed on the last day of the year,

### Exports for November, 1920, and Eleven Months Ending November 30

	November				Eleven Months Ending Nov. 30			
	1919		1920		1919		1920	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Aeroplanes .....	1	\$3,000	1	\$2,000	36	\$156,200	57	\$548,174
Aeroplane parts .....		77,706		906		3,248,989		524,406
Passenger .....	7,743	8,227,828	11,486	14,511,756	59,932	65,686,554	133,274	153,610,700
Commercial .....	1,712	3,143,351	2,330	4,557,385	14,104	32,889,384	26,876	43,168,368
Parts, not including engines and tires .....	..	3,644,460	..	8,480,615	..	37,565,548	..	77,818,024
Total automobiles and parts of .....	..	15,015,639	..	27,549,756	..	136,141,486	..	274,597,092
Motorcycles .....	2,884	790,289	3,605	1,112,877	22,163	6,055,805	33,385	9,355,057
ENGINES								
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
Automobile .....	2,921	\$393,988	220	\$63,743	28,853	\$4,350,851	30,246	\$4,968,282
Marine .....	572	209,924	746	231,513	10,095	4,187,630	8,875	2,895,169
Stationary .....	720	298,395	3,368	604,164	23,898	3,405,420	28,749	5,074,779
Traction .....	994	987,101	1,500	1,587,284	18,969	18,734,672	20,673	20,082,075
Total gasoline engines .....	7,207	\$1,889,408	5,834	\$2,486,704	81,815	\$30,678,573	88,543	\$33,020,305

were disappointing. They included only four Ballots, three Fiats, three Darracqs, two Sunbeams, two Talbots and one Mathis. Unless late entries are received at double fees it is doubtful whether the race will be held. **BADLEY.**

### Kelly Tire Reported Sought as G.M.C. Unit

NEW YORK, Jan. 5.—The Kelly-Springfield Tire Co. has declared the regular quarterly cash dividend of \$1 a share and the usual quarterly 3 per cent stock dividend on the common stock as well as the quarterly dividend of \$2 a share on the 8 per cent preferred. Stock of the company has risen rapidly on the stock exchange in the last few days on reports that several new directors soon will enter the board and that control of the company soon will be shifted to the Morgan interests. This is coupled with assertions that after these changes are made Kelly-Springfield will become a unit of General Motors, which now has no tire factory although it has close relations with the Dunlop Tire Co. It has been impossible to obtain confirmation of these reports.

### ROCKFORD TO AID COTTA

ROCKFORD, ILL., Jan. 3.—Business men of this city have launched a campaign to save the Cotta Transmission Co., manufacturer of motor vehicle accessories, now in bankruptcy. Since the company's difficulties reached an acute stage, there has been a desire upon the part of the leading citizens of Rockford to prevent a suspension. Several manufacturers in other lines have offered to assist in a financial way and some of the preferred stockholders have also volunteered their co-operation.

It is the impression that the trouble is only temporary and that a little aid at this juncture will tide the company over the present embarrassment. It is planned to sell enough stock to realize funds to take care of the pressing obligations. A committee of five leading merchants has been appointed.

## Car Exports Reach \$274,597,092 Total

Figures to November 30 Double  
Previous Year—Imports Grow  
to \$1,236,256

WASHINGTON, Jan. 3.—Both exports and imports of automobiles and accessories showed a remarkable increase in the statistics of foreign trade, compiled by the Bureau of Foreign and Domestic Commerce for November. The shipments of American cars for the first eleven months of this year were valued at \$274,597,092, as compared with \$136,141,486 for the corresponding period last year. These figures show that the foreign trade in automobiles has more than doubled.

Imports, too, have grown with the passing of the months, indicating the rehabilitation of European car manufacturers. There were 853 automobiles entered at American ports in the eleven months ended November. The declared value was \$925,669. For the same period in 1919, 107 cars valued at \$100,781 were placed on American markets. The automobile parts manufactured abroad and sold here increased tremendously for the total value of the shipments for the eleven months of 1919 was \$251,491, as compared with \$1,136,256 for the corresponding period this year. The imports of these products for November, 1919, were valued at \$79,584, as against \$107,264 for November, 1920. Nineteen cars, valued at \$53,054, entered this country in November last year and sixty-six cars, with a valuation of \$67,272, were imported for the same month this year.

The 4917 cars manufactured in this country and returned for various reasons were valued at \$7,855,499. This eleven months' total is large, for in the same period last year 1497 cars valued at \$3,199,675 were returned. Part of this increase is perhaps due to returned army cars.

## Harbeck Resigns from American Can

### Will Confine Activities to Auto- motive Interests—Maxwell- Chalmers Position Good

NEW YORK, Jan. 4—J. R. Harbeck has resigned as vice-president and director of the American Can Co. in order to devote all his time to his automobile interests. He felt that it was unfair to remain an officer of the can company when he was able to give it so little of his attention.

Harbeck for some months past has been devoting himself to the affairs of the various John N. Willys enterprises in which he is a director and to the reorganization of the Maxwell and Chalmers companies. He is vice-chairman of the reorganization committee which is headed by Walter C. Chrysler, executive vice-president of the Willys companies.

It is expected the Maxwell-Chalmers consolidation plan, which has been approved by a large majority of the stockholders and creditors, will be declared operative about the middle of this month. No announcement will be made about the appointment of a new active management until that time. Both companies are in much better financial position than they were a few months ago.

Harbeck is essentially a financial man and because of this ability he was drafted with Chrysler by bank interests to save the Maxwell-Chalmers combination. Besides being a director of other Willys companies he is president of the Duesenberg Motors Corp.

## Army Truck Dumping Burdens Coast Market

LOS ANGELES, CALIF., Jan. 5—Pacific Coast motor truck dealers are alarmed over the prospective effects on their business of the importation of war trucks from Europe and their sale in this country and the suggestion of Congressman Anthony that the War Department be compelled to release between 30,000 and 40,000 trucks. Seventy-five trucks imported from Europe were unloaded here a few days ago. Similar cargoes are destined for San Francisco, Portland and Seattle.

These trucks have been brought here by the Slough Trading Co. of England and their local representative says the trucks originally were sold abroad by agents of the American government. The shipment received here is made up of Packards and Rikers, all practically new. The representative of the Slough company claims they have 4000 similar trucks to be marketed in this country, including Whites, Pierces and Peerlesses in addition to the Packards and Rikers.

He is seeking to dispose of the local shipment intact, but if he is unable to do so, he probably will auction them. He also has on hand large quantities of tires

and tubes from the same sources. In view of the present market conditions, the arrival of these trucks from Europe and Anthony's proposal, the truck dealers are appealing to national associations and Congressional representatives for protection. They say the country might absorb 4000 trucks from Europe, but never 40,000 from the army.

## Wilson Body Declares Big Stock Dividend

DETROIT, Jan. 6—The C. R. Wilson Body Co. has declared a stock dividend of 300 per cent, payable to all stockholders of record. Notwithstanding financial depression the company has had the biggest year in its history. There now is a steady increase in the number of orders for bodies.

## REO RESUMES ON HALF TIME

LANSING, MICH., Jan. 6—The Reo Motor Car Co. has resumed operations after inventory. Its entire force of 5,400 men is working on half time.

## N. A. C. C. STATISTICS SHOW ACHIEVEMENTS OF INDUSTRY IN 1920

Automobile statistics for 1920 as prepared by Alfred Reeves, general manager of the National Automobile Chamber of Commerce, show a total car registration of about 8,500,000, of which 900,000 are trucks. Production for the year is shown as 2,241,000, of which 335,000 are trucks. The combined wholesale value of the product reached \$2,136,183,676. Exports for the year totaled \$338,000,000. The figures are shown in the following tables:

### Automobile Use

Automobiles registered in U. S. (approx.)	8,500,000
Passenger cars registered in U. S.	7,600,000
Motor trucks registered in U. S.	900,000
Cars and trucks owned by farmers	2,500,000
Per cent of registration in towns of 5000 population or less	55%
Per cent of registration in towns of 1000 population or less	33%
Per cent of 1920 output bought by agricultural districts	60%

### Automobile's Part in Nation's Business

Amount of special taxes paid annually by industry to Federal Government	\$257,000,000
Registration fees paid by car users	\$81,000,000
Amount paid by industry to railroads for freight shipments on finished motor vehicles	\$100,000,000

### Production in 1920

Cars and trucks produced	2,241,000
Passenger cars produced	1,906,000
Motor trucks produced	335,000
Wholesale value of cars and trucks produced	\$2,136,183,676
Wholesale value of passenger cars produced	\$1,703,437,213
Wholesale value of motor trucks produced	\$432,746,463

### Automobile Exports in 1920

Value of motor vehicles and parts exported, including engines and tires	\$338,000,000
Number of passenger automobiles exported	153,000
Increase in number of passenger cars exported	120%
Value of passenger cars exported	\$155,000,000
Number of motor trucks exported	27,000
Increase in number of trucks exported	60%
Value of motor trucks exported	\$45,000,000
Number of countries to which automobiles were exported during year	114

### Dealers and Garages in United States

Passenger car dealers	36,210
Motor truck dealers	20,596
Garages	38,538
Repair shops	47,556

## Templar Stockholders Ask Stock Accounting

COLUMBUS, Jan. 3—Alleging that the W. O. Cooper Co. of Cleveland had made unjust profits "in disposing of stock in the Templar Motor Co. of Cleveland," J. W. Wilson, owner of 200 shares of common stock in the automobile company, and B. Pittman, owner of fifty shares of common stock, filed suit in the local courts asking for an accounting from the W. O. Cooper Co., and also for the rescinding of the contract between the two concerns over the disposition of Templar stock. The Cooper company, it is claimed, was formed for the sole purpose of selling Templar stock.

M. F. Bramley and W. O. Cooper, stockholders in both corporations, are named defendants and are charged with collusion in obtaining advantageous terms for the sale of stock. It is alleged that the Cooper company has received 25 per cent on the sale of stock, and in addition a bonus of \$500,000 in Templar stock. Stock in the Templar Motor Co. unsold totals \$8,500,000.



## 900 Tickets Issued for S. A. E. Dinner

**Speakers to Discuss Economic  
Situation and Transportation  
—Review Road Tests**

NEW YORK, Jan. 5—The annual dinner of the Society of Automotive Engineers which will be held next Thursday evening, promises to be one of the most successful in the history of the organization. More than 900 tickets already have been sold and it is expected the attendance will exceed 1200. C. F. Kettering will act as toastmaster. The speakers will be G. E. Roberts, vice-president of the National City Bank, who will discuss the economic situation and R. E. W. Cowie, vice-president of the American Railway Express Co., whose subject will be "Transportation."

One of the innovations in the program for the convention this year will be the discussions which will mark each of the various sessions. It is intended to devote half the time to formal papers and the other half to an informal discussion of them. No papers at all will be read at the chassis session Wednesday afternoon. It is expected a dozen of the leading engineers in the industry will express their opinion on this subject.

At the highway session Thursday afternoon A. T. Goldbeck will tell in detail of the highway research work done at the Government experimental station at Arlington. Approximately 20,000 tests of the effects on highways of various kinds of tires have been made and this work will be reviewed by Goldbeck.

The engineers are displaying much interest in the annual carnival which will be held Wednesday evening. The committee has not disclosed the program but has promised many surprises.

Transportation to New York and return may be secured by members at the rate of a fare and a half upon application to ticket agents.

### Rubber Divisions to Meet

The various divisions and committees of the Rubber Association of America will meet the first four days of next week. The annual meeting of the association will be held Monday afternoon in the Astor Gallery at the Waldorf. The traffic committee and the executive industrial relations committee will hold sessions at the Yale Club, Monday morning, and the bicycle tire manufacturers committee at the same place Tuesday morning. The organization meeting of the board of directors to elect officers will be held at 4 p. m. Monday. A session of the executive committee of the tire manufacturers division, which will be held at the headquarters of the association Thursday morning, will be followed by a general meeting of the tire manufacturers division at the Yale Club in the afternoon. Luncheon will be served in connection with all the meetings.

So much interesting material has been made available for the aeronautic session of the Society of Automotive Engineers that two meetings will be held during the winter convention next week. The first will be Tuesday evening and the second Wednesday afternoon. Glenn L. Martin will preside at both.

## Price Drops Thought Likely During Show

NEW YORK, Jan. 5—Keen interest is being displayed throughout the industry on the possibility that numerous price changes will be announced during the New York show next week. The general belief is that prices will be scaled down. This is based on the fact that labor costs are becoming materially less and that numerous parts makers are announcing cuts. Steel and other raw materials also are down.

One report is that reductions will be announced on several of the General Motors lines. The utmost reticence is maintained at General Motors headquarters here on this subject, but it is known that President Du Pont has been in conference with several of the large distributors to learn whether they believe lower prices would stimulate business. Cadillac and Oakland are mentioned most frequently in this connection.

When other companies were following the lead of Henry Ford last fall, General Motors stood pat and guaranteed its prices until the first of this year. If its schedules are lowered it is confidently expected all other companies which have not reduced already soon will do so.

### DAVIS PRICES REDUCED

RICHMOND, IND., Jan. 3—George W. Davis Motor Car Co. has reduced prices on all models. The reductions range from \$200 to \$400 and bring the enclosed models under the \$3,000 mark. The touring car has been reduced from \$2,185 to \$1,895, the special sport car and special roadster from \$2,350 to \$2,150, and the coupe and sedan from \$3,185 to \$2,795. These reductions have been made possible by a decrease in the cost of materials.

### REYNOLDS CUTS PRICES

NEW YORK, Jan. 3—The Reynolds Machine Co., Massillon, O., manufacturers of automatic screw driving machinery for machine screws or wood screws, has sent letters to its customers announcing a substantial reduction in the price of its products.

The Electric Storage Battery Co. of Philadelphia has made a cut of 28 per cent in the price of Exide batteries of all sizes and types, effective Jan. 1.

### RIVETT REDUCES PRICES

BOSTON, Jan. 4—A trade bulletin issued by the Rivett Lathe & Grinder Co. says "You can buy now Rivett machines at prices comparing favorably with those in effect in 1914." In a tabulation of new prices, compared with "peak prices" it is found that the price reductions range from 20 to 43 per cent.

## METAL MARKETS

ONCE again the eyes of the metal market are riveted on the automotive industries, for there is no doubt that they are playing the part of the bellwether in the miniature buying movement that cast its shadows before in the closing days of the old year and which is slowly gaining momentum in the first week of the new year. So far only a small portion of this business is beyond the stage of preliminary negotiation, but the all-important fact that automotive buyers are once more in the market imparts to it an undertone of reassurance that is in sharp contrast with the doleful sentiment that had full sway a few weeks ago. To be sure, producers recognize that orders which a year ago would have been handed to them on a silver platter with the buyer's most devout wishes for speedy delivery will now cause an intensive scrimmage between sellers. The latter appear to be perfectly willing, however, to compete for business, being mighty grateful that some is to be had. This is the all-important fact. With the Ford Motor Company in the market for upward of 30,000,000 bolts, nuts and rivets; the General Motors Corporation reported to have placed an order for \$1,000,000 worth of Oldsmobile bodies, and several passenger car builders inquiring for relatively good-sized tonnages of sheets, the steel industry is convinced that the corner has been turned. The automotive purchasing agent was the first out of the market, wherefore the prodigal's return is interpreted as a doubly happy omen.

Highly interesting, from a market point of view, are the brickbats which the copper industry is hurling at the automotive industries. A committee, known as the Copper and Brass Research Committee, has investigated the causes for the decline in copper consumption, and among these it has discovered that "in no one industry has public ignorance of the merits of copper and brass been more costly than in automobiles." "Since the first year of the war," says this report, "there has been a steady tendency toward iron products until the total amount of copper and brass now used in the average automobile is about 36 pounds. To this substitution in structural and working parts is attributed the tremendous increase in the automobile repair business in the last few years." With copper selling to-day at one-third of what it cost during the 1916 and 1917 flurries, it is quite possible that the automotive industries' interest in the metal may be revived to some extent, but the committee's findings ignore altogether the tremendous forward strides of alloy steels and heat treatment methods achieved since the war's outbreak.

**Pig Iron**—One report has it that the Ford Motor Company is now asking \$33 base furnace, or \$2 more than stated a few weeks ago. The market seems destined to remain in abeyance until consumers are convinced that they can not buy at \$30, or sellers that \$33 will not attract sufficient business.

**Steel**—Supplies of full finished body sheets in automotive builders' warehouses are reported to have dwindled and, aside from an inquiry for 1500 tons a month by a Detroit passenger car manufacturer, smaller tonnages are being sought by other interests. Prices generally are resting at the Corporation's levels.

**Aluminum**—Bargain lots of sundry imported and resale metal are still offered at 50 per cent below the sole producer's nominal contract price. At the first sign of demand the market is likely to stiffen considerably.

## FINANCIAL NOTES

**Chandler Motor Car Co.** has fixed its net profits at about \$5,000,000, or equivalent to \$18 a share on the 280,000 share capital. This is following all write-offs, including a severe inventory shrinkage. In 1919 Chandler earned \$26.91 a share before taxes on 210,000 shares. Total production for 1920 is expected to reach 26,000, an increase of 8,000 over the previous year.

**Gray & Davis**, under the new American Bosch management, has been able to develop a modest earning power, which holds out the promise of substantial profits whenever business revives. From August to October, inclusive, net earnings totalled \$36,000, after allowance of \$61,000 for depreciation.

**Miller Tire & Rubber Co.** has declared a dividend on common stock, but has reduced it from 8 per cent to 4 per cent a year, or at the rate of 1 per cent a quarter. The reduction is made because officials deemed it wise at this time not to disburse any more funds than necessary.

**Auto Sales Corp.**, reports net income of \$118,035 for ten months ending Oct. 31 after deducting charges and taxes. This is equal to \$2.22 a share on the \$2,656,100 preferred stock of 50 par value. The balance sheet shows total assets of \$7,575,414 and surplus of \$381,729.

**Paige-Detroit Motor Car Co.** notified the Detroit stock exchange yesterday that the monthly dividend of 1 per cent had been passed. The company reduced the dividend from 2 to 1 per cent several months ago when the slump came in the automobile industry.

**Parish & Bingham Corp.** has passed its quarterly dividend due at this time owing to business curtailment in December. The inventory position of the company also influenced directors in their determination to pass dividends at this time.

**Clayton & Lambert Mfg. Co.** has declared a dividend of 2½ per cent on all stock record Dec. 16. This is the fourth cash dividend paid during 1920, making a distribution of 10 per cent cash and 25 per cent stock during the year.

**Ohio Body & Blower Co.** has passed its quarterly dividend due at this time. Curtailment of operations in the automotive industry so reduced operations in the body division that the dividend was not earned in the last quarter.

**Biddle Motor Car Co.** creditors will meet Jan. 11 at 82 Beaver Street, New York, to prove claims, appoint a trustee, examine the bankrupt and transact such other business as may come before the meeting.

**Cleveland Tractor Co.** directors have declared the first quarterly dividend at the annual rate of 7 per cent, payable Jan. 1. Previous dividends were at the rate of 6 per cent per annum.

**Westcott Motor Car Co.**, Springfield, Ohio, has declared the usual 2 per cent quarterly dividend on preferred stock. The company is making preparations, to resume full operations Feb. 1.

**Pierce-Arrow Motor Car Co.** directors will meet in February, not Jan. 11, as reported, to vote on the regular quarterly preferred dividend payable April 1.

**Republic Motor Truck Co., Inc.**, has declared a quarterly dividend of \$1.75 a share on preferred stock payable Jan. 1 to stockholders of Dec. 20.

**Hupp Motor Car Corp.**, has declared a quarterly dividend of 2½ per cent on common stock, payable Feb. 1 to stockholders Jan. 15.

**Jones Motor Car Co.**, Wichita, Kans., has been thrown into bankruptcy and M. E. Garrison has been appointed trustee.

**Continental Motors Corp.** closed its books Jan. 4 in preparation for the annual meeting of stockholders, Jan. 19.

**Singer Motor Co.**, Mt. Vernon, N. Y., will be sold at auction Jan. 11, by order of Sidney S. Meyers, trustee.

**Jordan Motor Car Co.** paid its regular quarterly dividend Dec. 31.

G. M. C. Directorate  
Increased to 31

**NEW YORK, Jan. 3**—Directors of the General Motors Corp. at a meeting late last week omitted the stock dividend of one-fortieth of a share of common stock which has been paid quarterly since March of last year. The elimination of this portion of the customary dividend was no surprise, since there had been rumors recently that this was to be done. The directors declared the quarterly cash dividend of 25 cents a share on the common. The quarterly dividends of \$1.50 a share on the preferred, \$1.50 a share on the 6 per cent debentures and \$1.75 a share on the 7 per cent debentures were also declared. All of the dividends are payable Feb. 1 to stockholders of record Jan. 10.

The Board of Directors was increased to thirty-one members by the election of K. W. Zimmerschied, C. F. Kettering and F. D. Brown. Both Brown and Zimmerschied were elected vice-presidents of the company, the first named to have charge of finances under the Chairman of the Finance Committee. L. R. Beardsley was elected an assistant secretary.

The position of General Motors at this time is said to be strong. It has on hand at this time less than 3500 complete vehicles, which is a remarkable showing in view of the fact that the total production for the year will approximate 400,000. Inventories of raw materials have been substantially reduced. Plants are being kept in readiness, however, to speed up production.

## REPUBLIC RUBBER RESUMES

**YOUNGSTOWN, OHIO, Jan. 3**—Republic Rubber Corp. will resume operations Jan. 10, after being closed down since Dec. 23 for inventory and repairs. Pneumatic tire, tube and solid tire departments will begin with three eight-hour shifts on the 10th while the mechanical goods departments will resume Jan. 17. Orders received since the plant closed down are expected to keep it in operation for some time.

## KELLY GETS TRUCK ORDERS

**NEW YORK, Jan. 3**—Directors of the Kelly-Springfield Truck Co. met here today but transacted only routine business. No decision was reached in regard to opening the factory at Springfield, O. A steadily increasing number of orders is being received but no more vehicles will be produced until those on hand are sold. The directors believe the truck market is improving and that the outlook is brighter than it has been for some time.

## Bank Credits

Written exclusively for AUTOMOTIVE INDUSTRIES by the Guaranty Trust Co., second largest bank in America.

**NEW YORK, Jan. 6**—Withdrawal last week by the Government of \$36,000,000 of its funds, and the announcement of a further withdrawal of \$45,000,000 to take place early this week, had no outward effect on the money market last week. These Government operations, together with the maturity this week of some \$155,000,000 Treasury Certificates, had evidently been sufficiently anticipated. Call money was quoted without change all week at 7 per cent. Time money was scarce, with few transactions, and with nominal rates unchanged.

A decline of \$16,354,000 in Federal Reserve notes was responsible, in the main, for the slightly improved reserve position of the New York Federal Reserve Bank last week. Total gold reserves declined \$7,350,000, and bills on hand increased \$10,105,000. Net deposits increased \$5,129,000, and holdings of U. S. certificates of indebtedness declined \$18,974,000. Total earning assets declined \$8,869,000. The reserve position of the bank was better, for the first time during the year, than for the corresponding week of 1919.

The week-end statement of the Federal Reserve banks as a whole reflected an improved reserve position. The ratio of gold reserves to Federal Reserve notes in circulation, after setting aside 35 per cent against net deposits, equalled the figure of Dec. 17, when it was 50.5 per cent. This ratio had been equalled only once before in the year, and exceeded only on Jan. 23, 1920. The week before, the ratio had been 49.8 per cent.

This improvement was chiefly a result of a decline in Federal Reserve notes in circulation of \$60,245,000, accompanied by an increase in total gold reserves of \$3,531,000. The total cash reserves increased \$12,409,000. Bills discounted, secured by Government war obligations, declined \$36,227,000, and total earning assets declined \$18,012,000. Total net deposits, however, increased \$54,842,000.

## KARDELL PETITION FILED

**ST. LOUIS, Dec. 30**—An involuntary petition in bankruptcy was filed in the United States court yesterday against the Kardell Tractor & Truck Co. whose plant has been closed for two weeks. The company has built tractors but has never produced any trucks. The petitioning creditors are the Machine Products Co. of Cleveland with a claim of \$15,659.74; Ruebelman-Lucas Hardware Co., \$286.90, and William J. Kennedy Stationery Co., \$5. The acts of bankruptcy alleged are the payment on Nov. 20 of \$87.93 to Johnson Automobile Co. and on Nov. 24 of \$64 in Liberty Bonds to the Liberty Bank. W. H. Kardell is president, and J. C. Kardell, vice president, of the tractor company which was incorporated in 1917. They also are president and vice-president of the Kardell Motor Car Co., but the two have no connection.



## MEN OF THE INDUSTRY

**L. B. McEwing**, manager of the wholesale department of the Reo Chicago branch organization, has been promoted to the position of general sales manager with jurisdiction over both retail and wholesale departments as successor to N. O. Gilbert, former retail sales manager who has resigned. P. A. Collins until recently identified with the Reo factory engineering department has been named service manager of the Chicago branch.

**J. C. Culbertson**, president and general manager of the Wichita Motors Co. has been appointed a member of the committee which will work out the organization of the Foreign Trade Financing Corp., which will be formed with a capital of \$100,000,000 to conduct foreign trade. He is associated with some of the leading financiers of the country. Wichita Motors now is selling its products in 33 foreign countries.

**H. P. Meredith**, formerly manager of the Curtis Airplane and Motor Corp., Garden City, L. I., has joined the Maxwell-Chalmers organization in Detroit as general works engineer in charge of all building design, construction changes, plant maintenance and power plant operation. His duties will cover the company's plants in Detroit, Dayton, New Castle, Ind., and in Canada.

**Earl E. Harrington** has assumed his duties as general superintendent of the Delton Tire & Rubber Co., Baltimore. For the last five years he has been with the Goodyear Tire & Rubber Co. and his last service with it was in the technical service division where he worked on tire production and construction engineering problems.

**H. A. Oswald** has been made general manager and secretary-treasurer of the Hamilton Motors Co., Grand Haven, Mich. F. A. Inman has been named assistant to the general manager. E. A. Grabman is factory manager and fiscal agent representing the interest of Adolph Pricken, New York, the company's president.

**I. L. Walker**, manager of the engineering department of S. F. Bowser & Co., Inc., Ft. Wayne, Ind. has been appointed executive engineer. He has been connected with the company about twelve years. In his new position, he will have supervision over the company's dealings with insurance companies.

**W. L. Carver** has been made general manager and chief engineer of the Antigo Tractor Co., Antigo, Wis. B. W. Keene will be his assistant, and D. S. Stewart, designer of the tractor to be built by the company, has been elected a director and named consulting engineer.

**Alfred Weiland** has been appointed assistant to the president of the Pierce-Arrow Motor Car Co., acting for the president in matters relating to engineering. Weiland was formerly production engineer for the Wright-Martin Co., and later was with the Goethals Company.

**William Elliott Phelps** has been appointed general sales manager of the Haynes Automobile Co. He was formerly sales manager in the Chicago district for the Haynes company and previous to that had been general sales manager of the All American Truck Co.

**Max B. Loomis** has been made advertising manager of the Sparks-Withington Co. at Jackson. Mr. Loomis formerly was with the Reo organization and succeeds Major H. L. Hunt who returns to his newspaper work on the Jackson Evening News.

**C. A. Bishop** has been appointed western sales manager of the Hart-Parr Co. His headquarters will be at the factory, Charles City, Iowa. John P. Gregg has been named northwestern sales manager for the company.

**Dan B. Hurlbut** has been named factory representative of the Kroyer Motors Co., Stockton, Cal., manufacturers of the Wizard tractor. He was formerly connected with the International Harvester Co.

**A. O. Williams** is now secretary of the Automotive Association of Cleveland. Dale Brown has been acting secretary for the past year or so and Williams will now take up the active work.

**E. S. Partridge**, formerly Owen Magnetic and Liberty distributor in New York, has become New York branch manager for the American Motors Corp., manufacturers of the American 6.

**Allen C. Chambers** for three years sales manager of the Russel Motor Axle Co., tendered his resignation Jan. 1. He has announced no future connection.

**Dr. F. G. Cottrell** has resigned as Director of the United States Bureau of Mines. It has been arranged that H. Foster Bain of California shall succeed him.

**Millard S. Binney**, formerly advertising manager of the Traffic Motor Truck Co., has joined the Ross-Gould Co., advertising agency, St. Louis.

**W. E. Nutting** has been made general manager of the Detroit Motor Parts Co., to succeed R. B. Merrill, resigned.

**Frank B. Willis** has been appointed sales manager of the Duplex Truck Co., Lansing, Mich.

## Moline Executives

## Earn Promotions

**MOLINE, ILL., Jan. 3**—H. B. Dinneen, general trade manager of the Moline Plow Co., has been placed in charge of the manufacture of farm implements. He went with the company a year ago from the John Deere plow works, of which he then was manager, and the capacity he has displayed in that brief period has brought his promotion. His preliminary experience has given him a thorough knowledge of the field requirements for Moline goods. His place as general trade manager will be taken by F. W. Edlin, who has established a wide reputation among men engaged in the distribution of farm implements.

**Louis W. Fuller** has been transferred from the drill works at St. Louis to become manager of the plow works in this city.

## Liberty Takes Over

## Cameron Engine Sale

**BRIDGEPORT, CONN., Jan. 3**—The Cameron air-cooled engine, heretofore marketed by the Cameron Motors Corp., will hereafter be marketed as well as manufactured by the Liberty Mfg. Co., this city. Cameron will continue his identification with the Cameron engine as engineer in charge and also as a director.

A new plant completely equipped for and entirely devoted to engine production has just been completed by Liberty at Stratford, a suburb of Bridgeport. This plant will have a capacity of 30 complete engines per eight hour shift.

## INDUSTRIAL NOTES

**American Bosch Magneto Corp.** expects to ship some 12,000 magnetos in the first two months of 1921. This compares with 40,000 in a single month in 1920. Beginning March 1 the company expects a decided improvement in business. The financial position of the company is good, its total quick assets being four times its liabilities. It is borrowing about \$1,000,000.

**S. F. Bowser & Co., Inc.**, Fort Wayne, Ind., did a \$9,000,000 business in 1920 and is looking forward to increasing this to \$12,000,000 in 1921. One per cent of the 1920 business has been set aside for distribution as a bonus to employees in July.

**Cutler-Hammer Mfg. Co.** has opened district offices in St. Louis under the management of Harold Phillips, formerly of the engineering department, Chicago.

**Dayton Engineering Laboratories Co.** has deferred the erection of its new \$1,000,000 plant, owing to the present falling off in demand for automotive products.

**McKone Tire & Rubber Co.** will move its plant from Carrollton to Millersburg, Ohio, where the plant of the Foster Tire & Rubber Co. has been purchased.

## Erie Tire Officials

## Held on Indictments

**CLEVELAND, Jan. 4**—The Erie county grand jury at Sandusky last week returned indictments for embezzlement against P. F. Wills and C. H. Roth, of Cleveland, both prominent in the affairs of the Erie Tire & Rubber Co.

Wills, president of the company, is charged in the indictment with obtaining \$41,886.20 of the funds of the company, and Roth, a former treasurer, is charged with taking \$63,593.82 for his personal use. While neither Wills or Roth have made a statement on the matter, it was learned that the indictments were the result of differences between the stockholders, and that both men accused claim to have defences. A stockholders' investigation was started last summer. Prominent in that probe were R. J. Bender, assistant auditor; William H. Briggs, purchasing agent; and H. H. Forest, office executive.

The grand jury charges that Wills took company funds by illegal operations through seventeen banks, and that Roth manipulated stock and other securities owned by the company. The corporation was capitalized some time ago for \$4,000,000 and recently the capital was increased to \$10,000,000, and extensive plant additions were made. The plant recently was closed for inventory.

## OBENBERGER COMMITTEE NAMED

**MILWAUKEE, Jan. 4**—Roland LeBarre of the Interstate Iron & Steel Co. of Chicago has been appointed chairman of the creditors committee which is in charge of the affairs of the Obenberger Forge Co. An effort will be made to work out a plan under which all creditors will be paid in full and the company can be kept in operation. The assets exceed \$1,000,000 and the liabilities are approximately \$800,000.

# Calendar

## SHOWS

- Jan. 8-15—New York. National Passenger Car Show, Grand Central Palace. Auspices of N.A.C.C.
- Jan. 10-17—Portland, Ore., Annual Automobile Show, Automobile Dealers' Ass'n. Municipal Auditorium, M. O. Wilkins, Mgr.
- Jan. 15-22—Philadelphia, Annual Automobile Show, Philadelphia Automobile Trade Ass'n.
- Jan. 17-23—Milwaukee, Annual Automobile Show, Milwaukee Automotive Dealers' Ass'n.
- Jan. 22-27—San Francisco, Second Annual Pacific Coast Automotive Exposition, Auditorium.
- Jan. 22-29—Baltimore, Annual Automobile Show, Baltimore, Automobile Dealers' Ass'n, 5th Regiment Armory, J. C. O'Brien, Mgr.
- Jan. 22-29—Cleveland, Annual Passenger Car Show, Cleveland Mfr's & Dealers' Ass'n, Wignome Coliseum.
- Jan. 22-29—Montreal, Annual Automobile Show, Montreal Automobile Trade Ass'n, Motordrome Bldg.
- Jan. 29-Feb. 4—Chicago, National Passenger Car Show, Coliseum, Auspices of N.A.C.C.
- Feb. 5-12—Minneapolis, Annual Automobile Show, Minneapolis Automobile Trade Ass'n.
- Feb. 7-12—Columbus, National Tractor Show, Columbus Tractor & Implement Club, Ohio State Fair Grounds.
- Feb. 12-19—Hartford, Conn., Annual Automobile Show, Hartford Automobile Dealers Ass'n, Armory, Arthur Flfoot, Mgr.
- Feb. 12-19—Kansas City, Annual Automobile Show, Kansas City Motor Car Dealers' Ass'n.
- Feb. 14-19—St. Louis, Annual Automobile Show, St. Louis Automobile Mfr's & Dealers' Ass'n, Robt. E. Lee, Mgr.
- Feb. 14-19—Winnipeg, Western Canada Automotive Equipment Show.
- Feb. 18-23—San Bernardino, Cal., National Orange Show, Fred M. Renfro, Mgr.
- Feb. 19-26—San Francisco, Fifth Annual Pacific Automobile Show, Exposition Auditorium, George Mahlgreen, Mgr.
- Feb. 21-26—Louisville, Annual Automobile Show, Louisville Automobile Dealers Ass'n, First Regiment Armory, C. L. Alderson, sec'y.

Feb. 21-26—Salt Lake City, Annual Automobile Show, Intermountain Automotive Trades Ass'n, W. D. Rishal, Mgr.

Feb. 26-Mar. 5—Buffalo, Annual Automobile Show, Buffalo Automobile Dealers Ass'n, 74th Regiment Armory, C. C. Proctor, Mgr.

Mar. 2-10—Des Moines, Annual Automobile Show, Coliseum, C. G. Van Vliet, Mgr.

Mar. 5-12—Brooklyn, Annual Automobile Show, Brooklyn Motor Vehicle Dealers' Ass'n, 23d Regiment Armory, George C. Lewis, chairman.

Mar. 7-12—Syracuse, N. Y., Annual Automobile Show, Syracuse Automobile Dealers Ass'n, Armory, Howard H. Smith, Mgr.

Mar. 7-12—Indianapolis, Annual Automobile Show, Indianapolis Automotive Trade Ass'n, Automobile Bldg., State Fair Grounds, John Orman, Mgr.

Mar. 12-19—Boston, Annual Automobile Show, Mechanics Bldg. and South Armory.

Mar. 14-19—Omaha, Annual Automobile Show, Omaha Automobile Trade Ass'n, Inc., Omaha Auditorium, C. G. Powell, Mgr.

April 4-9—Seattle, Annual Automobile Show, Seattle Motor Car Dealers' Ass'n, Arena Hippodrome.

April—Chattanooga, Tenn., Spring Automobile Show, Chattanooga Automotive Trade Ass'n, Sunday Tabernacle, C. A. Noone, sec'y.

## FOREIGN SHOWS

Jan. 22-29—Colombo, Ceylon Motor Show.

Feb. 7—Delhi, India, Delhi Motor Show.

Mar. 23-28—Witwatersrand Agricultural Show including machinery and motors sections.

## CONVENTIONS

Jan. 11-13—S. A. E. Annual Meeting, New York City.

Feb. 2-4—Chicago, First Annual Meeting, Automotive Electric Service Assn. Hotel La Salle.

May 4-7—Cleveland, National Foreign Trade Council.

Oct. 12-14, 1921—Chicago, Twenty-Eighth Annual Convention National Implement & Vehicle Ass'n.

## Van Sicklen to Sell New Newark Factory

NEWARK, N. J., Jan. 4—Due to the change in the industrial situation, the Van Sicklen Co., a Willys subsidiary, has determined to abandon its plan to build speedometers here in the new plant just completed at 76-84 Warren Street, and will instead continue the manufacture at the present plant at Elgin, Ill.

In keeping with this decision the Newark plant has been offered for sale and negotiations looking to this end are expected to be completed within a few days. The sales price has been fixed at \$850,000. C. W. Curtiss, who resigned as general manager of the Splitdorf company to accept the general managership of the Van Sicklen company, will represent the latter in the sale of the building and will then sever his connections. His plans for the future are not announced.

The building is a modern eight-story structure, with a sprinkler system throughout, containing 186,000 sq. ft. of floor space. Much of the machinery for the new building had been contracted for and some of it had been set up. With the change in plans this machinery will be sold for the most part and some of it transferred to the Elgin plant where it will be employed.

## N. A. C. C. SURVEYS FARM TRUCKS

NEW YORK, Jan. 4—The motor truck committee of the National Automobile Chamber of Commerce, with the co-operation of departments of agriculture in all States, will make a survey of the use of motor vehicles on farms throughout the country. A questionnaire similar

to the one mailed in the recent New York State survey will be used. Seven questions are outlined which aim to discover the needs of individual communities and to ascertain the value of co-operative motor truck lines in specific localities.

## Goethals to Advise on Ohio Highways

COLUMBUS, Jan. 3—Governor-elect Harry L. Davis announces that he has wired Major General George W. Goethals, builder of the Panama Canal, and former Quartermaster General of the Army, asking for a conference in Columbus immediately after his inauguration early in January for the purpose of getting advice on the reorganization of the Ohio Highway Department. The reorganization of the Ohio Highway Department has been given a great deal of attention by the incoming governor and which he promised to accomplish during his campaign speeches.

"I am looking for the biggest man I can find to aid me in the reorganization of the Ohio Highway Department, which spends millions of dollars each year on roads," said the Governor-elect. General Goethals will be asked to spend as much time as possible in Ohio while the reorganization is taking place.

## NEW CASTLE RUBBER SUED

NEW CASTLE, PA., Jan. 3—An involuntary petition in bankruptcy has been filed by Chicago creditors against the New Castle Rubber Co. Assets are estimated at \$1,500,000 and liabilities at \$4,500,000.

## Tilden to Direct Highway Education

NEW YORK, Jan. 3—C. T. Tilden, professor of engineering mechanics at Yale University, and one of the best known engineering educators in the United States, has been named director of the work of the Highway and Highway Transport Education Committee with headquarters at Washington. He will take up his duties at once and will formulate a comprehensive program for courses in highway and highway transport education.

Professor Tilden was called to Yale from Johns Hopkins a year ago to undertake the reorganization of the engineering courses at Yale. The importance of his present task may be gaged from the fact that the Yale authorities were ready to grant him a year's leave of absence in order to lay out the program of work for the new organization.

Professor Tilden is the author of a number of technical and historical papers on engineering, one of the most interesting, perhaps, being that on "Kinetic Effects of Crowds." He has also held positions as consulting engineer, being attached to the staff of the Bureau of Public Roads and the Emergency Fleet Corp. in that capacity.

The Highway and Highway Transport Education Committee is the outgrowth of a conference on these subjects held in Washington last May.

## U. S. LIGHT CUTS BATTERY

NIAGARA FALLS, N. Y., Jan. 3—United States Light & Heat Corp. has reduced prices on its batteries from 20 to 25 per cent, effective at once.